Clare County Council

Application for Wastewater Discharge Certificate for Toormore (Ruan)

Non-technical summary

In accordance with Article 5 of Waste Water Discharge (Authorisation) Regulations, S.I. 684 of 2007
Section A: Non-technical summary

1  Introduction
Clare County Council is submitting an application to the Environmental Protection Agency (EPA) for a certificate to discharge treated wastewater from the wastewater collection system serving the Council housing scheme at Toormore (Ruan), in accordance with Article 5.2 of the Wastewater Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007), as amended. The application form and its attachments are completed as required by the EPA in accordance with guidance notes provided.

2  Description of Ruan Village
Ruan is a small village approximately 11 kilometers to the north of Ennis. The housing development, to which this application refers, is a Council Housing Scheme, which is located immediately south-west of Ruan village within the townland of Toormore. The development is a 32 house scheme for which a wastewater treatment facility was upgraded in 2005. A map indicating the agglomeration served by the Toormore (Ruan) sewer network and the location of the wastewater treatment facility is provided as Attachment B.1.

3  Wastewater sources
Domestic wastewater is the only component of discharge to the Toormore (Ruan) sewer collection system i.e. the sewer is a foul collection system only. Permission was granted for a scheme to increase the population served on the July 14th 2001 - File Reference Number LA-01-06. There are no commercial or industrial sector discharges to the plant or proposals to increase the population served by the WWTP.

4  Wastewater Flow volumes
The estimation of 93 p.e. for the Toormore (Ruan) agglomeration is based on the mean house occupancy for the 32 houses within the development. No flow data is currently available for the system however taking account of the design p.e. of 93, this equates to an average daily flow of 16.74m³ if based on an hydraulic load of 180 litres/head/day.

5  Treatment Process Description
The wastewater treatment unit serving the development comprises of a Kee 0975 NuDisc unit, which is a self contained unit consisting of primary settlement, rotating biological contactor (RBC) for the biological stage and final settlement and clarification before discharge to a percolation area via a sand polishing filter and UV system. Details of the treatment facility are provided in Attachments C.1.
6 **Sludge Management**
Intermittent desludging of the WWTP is undertaken as required.

7 **Combined storm overflows**
There are no combined storm overflows in the system. The sewer system is a foul only collection system, with no overflows.

8 **Impact of discharges on Receiving Waters**
The final discharge from the Toormore (Ruan) agglomeration is to a percolation area and ultimately to the Ennis Ground Water Body Code: Sh_G_080. The overall impact on the Ennis Ground Water Body is estimated by reference to the existing status of the water body which is described as “Poor” status.

The receiving waters are considered under a number of headings:
- Description of receiving waters
- Statutory Designations of the Receiving Waters
- Total maximum nutrient load discharging to receiving waters
- Assimilative capacity of the receiving waters
- Monitoring undertaken on receiving waters
- Impact of storm overflows

8.1 **Description of receiving waters**
The Shannon River Basin Management Plan describes the Ennis Ground Water Body as karstic and lists it as “poor” status with the overall objective to “Restore to Good Status” by 2021. The status report is provided in Attachment F.1.1 to this application. The WWTP site at Toormore (Ruan) is also situated within the Inner Protection Zone for Pouladower Spring, which is located approximately 5.5 km downstream to the north-west of Ballyallia lake. In 2000, a report\(^1\) was carried out by the Geological Institute of Ireland (GSI) to delineate the catchment area for the spring, with a view to using the spring as an additional water source for drinking water in Ennis. Pouladower spring is not used as a water supply source and the protection zone is not applicable, but is useful as a description of the complex water flows in the area. A copy of the draft report is provided in Attachment F.1.2.

8.2 **Statutory designations of Receiving Waters.**
A number of protected sites are located in proximity to the Toormore (Ruan) WWTP site and are described in Table 1 below. A map identifying the Natura sites within a 5 kilometer radius of the Toormore, Ruan WWTP is provided as Attachment B.2.1. The sites have been selected for conservation of numerous habitats including Limestone pavements, Alkaline and

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\(^1\) Deakin, J. GSI, 2000, Ennis Public Supply Pouladower Spring Co. Clare
Calcareous fens, water courses and natural eutrophic lakes, semi-natural grasslands, numerous protected flora and fauna species. The site in closest proximity to the WWTP at Toormore (Ruan) is the Dromore Woods and Loughs SAC Site Code: 000032 situated to the east. The Pouladower spring catchment area overlaps with the Dromore Woods and Loughs SAC.

Other protected sites in the vicinity of the WWTP at Toormore (Ruan) include the East Burren Complex SAC to the north west of the site, Ballyogan Lough SAC and the Moyree River System SAC to the north-east, Ballycullinan Lough SAC to the west and Ballyallia Lough SAC, SPA and pNHA to the south. Only those sites within the 5 kilometer radius of the WWTP at Toormore (Ruan) site are listed in Table 1 below. Three other SAC sites located within the 5 km radius of the WWTP as designated as SAC with the feature of interest as the Lesser horseshoe bat.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Protected Site</th>
<th>Code</th>
<th>Distance (km)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dromore Wood and Lough SAC &amp; pNHA</td>
<td>000032</td>
<td>1.0</td>
<td>East of site</td>
<td></td>
</tr>
<tr>
<td>East Burren Complex SAC &amp; pNHA</td>
<td>001926</td>
<td>1.6</td>
<td>West North-West</td>
<td></td>
</tr>
<tr>
<td>Ballyogan Lough SAC &amp; pNHA</td>
<td>000019</td>
<td>3.24</td>
<td>North-east</td>
<td></td>
</tr>
<tr>
<td>Ballycullinan Lough SAC &amp; pNHA</td>
<td>000016</td>
<td>3.2</td>
<td>West</td>
<td></td>
</tr>
<tr>
<td>Moyree River System SAC &amp; pNHA</td>
<td>000057</td>
<td>3.9</td>
<td>North-east</td>
<td></td>
</tr>
<tr>
<td>Ballyallia Lake SAC, SPA &amp; pNHA</td>
<td>000014 &amp; 004041</td>
<td>5.1</td>
<td>South</td>
<td></td>
</tr>
<tr>
<td>Ballycullinan Old Domestic Building SAC</td>
<td>002246</td>
<td>3.3</td>
<td>West South-west</td>
<td></td>
</tr>
<tr>
<td>Old farm Building Ballymacrogan SAC</td>
<td>002246</td>
<td>0.7</td>
<td>South-west</td>
<td></td>
</tr>
<tr>
<td>Toonagh Estate SAC</td>
<td>002247</td>
<td>5.1</td>
<td>South</td>
<td></td>
</tr>
</tbody>
</table>

8.3 Total maximum nutrient load discharging to receiving waters

No analytical data for the wastewater discharge from the Toormore (Ruan) agglomeration is available to estimate the nutrient load discharging on the receiving waters.

8.4 Assimilative capacity of receiving waters

No data is available to assess the assimilative capacity of the receiving waters.
8.5 Monitoring undertaken on receiving waters

Analytical data is not available to assess the assimilative capacity of the receiving waters however reference is made to the existing status of the water body, Ennis Ground Water Body Code: Sh_G_080, which is described as “Poor” status. The status report is provided as Attachment F.1.1 to this application. In addition due to the complex hydrogeological flow regime in the area, with ground and surface waters closely interlinked, the water quality of the River Fergus is assessed with a view to the assimilative capacity in the receiving waters of the discharge. The most recent water quality status or Q rating (EPA data), for the River Fergus indicates the water quality at Nutfield Bridge, over 4 km downstream of Ruan is moderate i.e. Q 3-4.

8.6 Impact of storm overflows

There are no pumping stations in the agglomeration.

9 Proposed technology for improving emissions from WWTP

The Wastewater treatment facilities at the WWTP at Toormore (Ruan) were upgraded in 2005. There are no proposals in place for further upgrading to the WWTP serving the Toormore (Ruan) agglomeration.

10 Measures planned to monitor emissions into the environment

Provisions for monitoring emissions from the agglomeration will be put in place for the WWTP at Toormore (Ruan).
Programme of Improvement
Programme of Improvement

The wastewater treatment unit serving the development comprises of a self contained unit consisting of

- Primary settlement,
- Rotating Biological Contactor (RBC) for the biological stage
- Settlement and clarification.
- Final discharge to a percolation area via a sand polishing filter and UV system.

The WWTP serving the Toormore (Ruan) agglomeration was upgraded in 2005. Currently there are no proposals in place to upgrade the plant or to increase the population equivalent (p.e.) of 93 served. There is no analytical data available for the wastewater discharge from the WWTP at Toormore (Ruan), however a monitoring programme will be put in place to ensure compliance with the Urban Waste Water Treatment Regulations, 2001 -2010.
Attachment F1

Impact on Receiving Water
Impact on Receiving Water

The impact of discharges from the Toormore, Ruan WWTP on the receiving waters are considered under a number of headings:

1.1. Description of receiving waters
1.2. Total maximum nutrient load discharging to receiving waters
1.3. Assimilative capacity of the receiving waters
1.4. Monitoring undertaken on receiving waters
1.5. Abstraction of water downstream of the discharge
1.6. Impact of storm overflows
1.7. Statutory Designations of the Receiving Waters

1.1 Description of receiving waters

Effluent from the treatment works site discharges to a percolation area, located within the WWTP site area as provided in Map B.1 and ultimately to the Ennis Ground Water Body Code: Sh_G_080. The overall impact on the Ennis Ground Water Body is estimated by reference to the existing status of the water body which is described as “Poor” status. The status report is provided in Attachment F.1.1 to this application.

The Ruan WWTP site is also situated within the Inner Protection Zone for Pouladower Spring, which is located approximately 5.5 km south of Ruan to the north-west of Ballyallia lake. In 2000, a report¹ was carried out by the Geological Institute of Ireland (GSI) to delineate the catchment area for the spring, with a view to using the spring as an additional water source for drinking water in Ennis. Pouladower spring is not used as a water supply source hence the protection zone has not been adopted, but the protection zone is useful as a description of the complex water flows in the area. A copy of the draft report is provided in Attachment F.1.2. The report describes the bedrock as limestone and karstified resulting in a complex surface hydrology which is closely interlinked with groundwater. Water flow is in a north to south direction. The link between the Ruan area and Pouladower Spring was confirmed in findings of a water tracing study carried out in 2012, when water from Moymore quarry (approximately 1.5 km south of Ruan) was traced to Pouladower spring. The water trace study also confirmed that there is no link between Pouladower Spring and Drumcliff Springs, which is the water supply source for drinking water in Ennis. A copy of the report is provided in Attachment F.1.3.

1.2 Total maximum nutrient load discharging to receiving waters

Analytical data is not available for assessment of the nutrient loading from the discharge on the receiving waters. Additional attenuation or treatment of the discharge within the percolation area is available, which further minimises the impact from the discharge on the receiving waterbody. The WWTP was upgraded in 2005 to serve a population

¹ Deakin, J. GSI, 2000, Ennis Public Supply Pouladower Spring Co. Clare
equivalent (p.e.) of 93. There has been no increase in the p.e. within the agglomeration since that date. Soils in the vicinity of the WWTP site are described as Brown Earths, which have good drainage characteristics.

1.3 Assimilative capacity of receiving waters
The discharge from the Toormore, Ruan WWTP discharges to a percolation area and ultimately to groundwater. Analytical data is not available in order to assess the assimilative capacity of the receiving waters. However reference is made to the existing status of the water body, Ennis Ground Water Body Code: Sh_G_080, which is described as "Poor" status. The status report is provided in Attachment F.1.1 to this application. Due to the complex hydrogeological flow regime in the area with ground and surface waters closely interlinked, the water quality of the River Fergus is also assessed with a view to assessing the capacity of the receiving waters to assimilate the discharge. The most recent water quality status or Q rating (EPA data), for the River Fergus is described below in Table 1 and indicates the water quality at Nutfield Bridge, over 4 km downstream of Ruan is moderate i.e. Q 3-4.

Table 1 River Fergus Monitoring 2010 (EPA Data)

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Location</th>
<th>Q rating</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0300</td>
<td>Corofin Br.</td>
<td>3-4</td>
<td>Moderate</td>
</tr>
<tr>
<td>0400</td>
<td>Addroan Br.</td>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>0500</td>
<td>Nutfield Br.</td>
<td>3-4</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

During the course of preparing the application for a discharge certificate, for Toormore (Ruan) WWTP to the EPA, Clare County Council assessed the Toormore (Ruan) agglomeration to identify any facility liable to generate substances listed in Annex X of the Water Framework Directive (2000/60/EC) or relevant pollutants listed in Annex VIII of the Water Framework Directive. Monitoring for these substances was undertaken in May 2013 and the results on this monitoring do not indicate any substance on the list was present in the discharges from the WWTP at Toormore (Ruan). No potential source of these pollutants has been identified in the sewer catchment, so it is unlikely that the discharge will contain the listed substances. It is noted that nutrient levels (Total Phosphorus and Total Nitrogen) in the discharge are elevated. Results from the survey are are provided in tables D.1(i) and F.1 via the web based link: http://78.137.160.73/epa wwd licensing/.

1.4 Abstraction of water downstream of the discharge
For the purposes of identifying abstraction sources, which may be impacted by the discharge, reference is made to the Pouladower Inner Protection Zone, which was delineated by the GSI during survey work carried out in 2000. There are no abstraction
sources within the Pouladower inner protection zone or within the zone of contribution when account is taken of the water flow regime from north to south.

Pouladower spring is located approximately 5.5 km downstream of Ruan to the northwest of Ballyallia lake. The Ennis water supply source, Drumcliff Springs, is situated 2.3km south of Pouladower spring, however *All the water sinking in Moymore quarry flows to Pouladower and therefore the Drumcliff and Pouladower systems are not linked.* (Drew, D. 2012, Water tracing from Moymore Quarry (Ruan) County Clare).

### 1.5 Impact of storm overflows

There is no storm overflow facility at WWTP at Toormore (Ruan).

### 1.6 Statutory designations of the Receiving Waters

A number of protected sites are located in proximity to the WWTP site at Toormore (Ruan) and are described in Table 2 below. The sites have been selected for conservation of numerous habitats including Limestone pavements, Alkaline and Calcareous fens, water courses and natural eutrophic lakes, semi-natural and wet grasslands, and protected flora and fauna species. The site in closest proximity to the WWTP at Toormore (Ruan) is the Dromore Woods and Loughs SAC situated to the east. The Pouladower spring catchment area overlaps with the Dromore Woods and Loughs SAC.

Other protected sites in the vicinity of the WWTP at Toormore (Ruan) include the East Burren Complex SAC to the north west of the site, Ballyogan Lough SAC and the Moyree River System SAC to the north-east, Ballycullinan Lough SAC to the west and Ballyallia Lough SAC, SPA and pNHA to the south. Only those sites within the 5 kilometer radius of the WWTP site at Toormore (Ruan) are listed in Table 2 below. Three other SAC sites located within the 5 km radius of the WWTP are designated as SAC sites with the feature of interest being the Lesser horseshoe bat. Attachment F.1.4 describes the impact of the discharge on the Natura Sites. A map identifying the Natura and pNHA sites within a 5 kilometer radius of the Toormore, Ruan WWTP is provided as *Attachment B.2.1.*

Due to the karst topography of the area, the hydrogeological flow regime is complex, with groundwater closely interlinked with the surface hydrology i.e the River Fergus system. The main channel of the River Fergus is designated a “salmonid” water, under the *European Communities (Quality of Salmonid Waters) Regulations, S.I. 293 of 1988.* Clare County Council undertakes monitoring of the river at all the main bridges, along the length of the main river channel. Monitoring data for Corofin Bridge (Code 0300), Addroan Bridge (Code 0400), and Nutfield Bridge (Code 0500) (carried out in accordance with the parameters listed in the *European Communities (Quality of Salmonid Waters) Regulations, S.I. 293 of 1988*) indicates that the water quality is of high status.

The River Fergus is designated as a Sensitive Area in the Urban Waste Water Treatment (Amendment) Regulations, 2010 (S.I. No. 48 of 2010) from the sewage outfall at
Clonroadmore, Ennis, to the freshwater limit of the Fergus Estuary however the designated area is over 8km downstream from the WWTP at Toormore, Ruan.

Table 2 Listed of Protected Sites

<table>
<thead>
<tr>
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<tr>
<td>East Burren Complex</td>
<td>SAC &amp; pNHA</td>
<td>001926</td>
<td>1.6</td>
<td>West North-West</td>
</tr>
<tr>
<td>Corofin Wetlands</td>
<td>SPA</td>
<td>004220</td>
<td>3.2</td>
<td>West North-West</td>
</tr>
<tr>
<td>Ballycullinan Lough</td>
<td>SAC &amp; pNHA</td>
<td>000016</td>
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<td>Ballyalia Lake</td>
<td>SAC, pNHA &amp; SPA</td>
<td>000014 &amp;</td>
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</table>

1.7 Monitoring undertaken on receiving waters

Due to the nature of the discharge point to a percolation area, no monitoring has been carried out of the receiving waters.
Conservation Objectives for Dromore Woods and Loughs SAC [000032]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
- [1303] Rhinolophus hipposideros
- [1355] Lutra lutra
- [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- [8240] Limestone pavements

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

SITE NAME: DROMORE WOODS AND LOUGHS

SITE CODE: 000032

Situated in central Clare 9 km north-north-west of Ennis, the site lies on the southern edge of the Clare limestone. The topography is a continuation of the Burren type landscape although at a lower elevation, with most of the land lying between 15 and 35 m. The site includes several lakes which are mostly linked by the River Fergus.

The site is very diverse and contains a mosaic of different habitats: limestone pavement, scrub, dry broadleaved woodland, mixed woodland, lakes, rivers, grasslands, cutaway bog, fen, freshwater marsh and reedbeds.

The site contains extensive areas of limestone pavement, with a covering of soil which is thin or absent, interrupted by corridors and pockets of slightly deeper soil. The limestone pavement on the site is floristically species-rich and occurs in association with calcareous grassland, Hazel (Corylus avellana)/Ash (Fraxinus excelsior) scrub, lakes and fen.

The natural vegetation of much of the site is Hazel and Ash scrub, but there has been considerable planting of conifers - mostly Scots Pine (Pinus sylvestris), Norway Spruce (Picea abies) and Larch (Larix spp.), and to a lesser extent Beech (Fagus sylvatica). Much of the broadleaved woodland on the site has been underplanted with conifer species.

The lakes on the site are naturally eutrophic, a habitat listed on Annex I EU Habitats Directive, and contain some fringing reed beds of Common Reed (Phragmites australis) and Common Club-rush (Scirpus lacustris) and large beds of Pondweed (Potamogeton), including P. lucens and P. perfoliatus.

Eutrophic tall herb vegetation occurs as part of the wet fringing vegetation around the lakes and along the river. Characteristic species of the habitat include Meadowsweet (Filipendula ulmaria), Purple Loosestrife (Lythrum salicaria).

The site supports a wide range of plants and animals, including several rarities and important populations. The rare lichen, Usnea glabrescens, known from counties Clare, Cork and Galway has been recorded from the site. Dromore Lough holds regionally/locally important numbers of waterfowl (numbers are the average of two counts made in one season, between 1984 and 1987): Little Grebe (20), Whooper Swan (73), a species listed on Annex I of the EU Birds Directive, Wigeon (130), Gadwall (4), Teal (80), Tufted Duck (169), Coot (152), Lapwing (350) and Curlew (50). The site also provides ideal habitat for birds of prey: Kestrel, Sparrowhawk and Hen Harrier, a species also listed on Annex I of the EU Birds Directive, have all been recorded.
Mammals found on the site include Pine Marten, Otter, Badger, Fox and Stoat. The site is of particular importance for its population of Pine Marten, a rare, Red Data Book species. Otter is a species that is listed on Annex II of the EU Habitats Directive. The site also includes a nursery roost for a population (more than 400 individuals) of Lesser Horseshoe Bat. This nursery colony is one of the biggest in the country and of international importance. Lesser Horseshoe Bat is a rare and threatened species that is listed on Annex II of the EU Habitats Directive. The roost is owned and managed by the Heritage Council.

The site is of importance for its invertebrate fauna, which includes several rarities: *Agonum lugens, Anasimyia transfuga, Xylota tarda, Dyschirius luedersi, Pherbellia aryra* and *Geomysa majuscula*.

Dromore Woods and Loughs is of considerable conservation significance for the wide diversity of habitats found (including three listed on Annex I of the EU Habitats Directive) and for the important populations of rare and threatened mammals, birds and invertebrates that it supports. Part of the site has been designated as a Statutory Nature Reserve.

8.1.2002
Conservation Objectives for East Burren Complex SAC [001926]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
• [1065] Euphydryas (Eurodryas, Hypodryas) aurinia
• [1303] Rhinolophus hipposideros
• [1355] Lutra lutra
• [3140] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
• [3180] * Turloughs
• [3260] Water courses of plain to montane levels with the Ranunculina fluitantis and Callitricho-Batrachion vegetation
• [4060] Alpine and Boreal heaths
• [5130] Juniperus communis formations on heaths or calcareous grasslands
• [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)
• [7210] * Calcareous fens with Cladium mariscus and species of the Caricion davallianae
• [7210] * Petrifying springs with tufa formation (Cratoneurion)
• [7230] Alkaline fens

Citation:

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning
- [8240] * Limestone pavements
- [8310] Caves not open to the public
- [91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

For more information please go to: [www.npws.ie/protectedsites/conservationmanagementplanning](http://www.npws.ie/protectedsites/conservationmanagementplanning)
SITE SYNOPSIS

SITE NAME: EAST BURREN COMPLEX

SITE CODE: 001926

This large site incorporates all of the high ground in the east Burren, and extends south-eastwards to include a complex of calcareous wetlands. The area encompasses a complete range of limestone habitats that include limestone pavement and associated calcareous grasslands and heath, scrub and woodland together with a network of calcareous lakes and turloughs. The site exhibits some of the best and most extensive areas of oligotrophic limestone wetlands to be found in the Burren and in Europe.

The limestone pavement includes smooth blocky and shattered types. The bare pavement is interspersed with species-rich calcareous vegetation communities. Typical grassland species found include Blue Moor-Grass (*Sesleria albicans*), Mountain Everlasting (*Antennaria dioica*), Bloody Cranesbill (*Geranium sanguineum*) and Wild Thyme (*Thymus praecox*). Limestone Heath is well developed in part of the uplands where Heather (*Calluna vulgaris*) and Bell Heather (*Erica cinerea*) are common along with St. John’s-wort (*Hypericum spp.*) and Tormentil (*Potentilla erecta*). Two rare plant species which are common to this habitat include the Hoary Rock-rose (*Helianthemum canum*) and Pyramidal Bugle (*Ajuga pyramidalis*); both species are listed in the Red Data Book. To the south-east around the western shores of Lough Bunny an interesting heath community with Bearberry (*Arctostaphylos uva-ursi*) occurs at one of its few inland lowland locations in the Burren.

Caves are a feature of this site, with four known natural limestone caves showing a variety of formations and passage types. Vigo Cave has one of the best undisturbed cave entrance facies in Ireland and is considered a valuable karst heritage landform. Glencurrane Cave shows some fine phreatic solution features and one passageway, known as “Crinoid Tower” shows an abundance of crinoids which have been etched out by splashing water. Gortlecka Cave and a series of small caves above Lough Inchiquin are other fine examples of this habitat.

Ballyeighter Loughs complex to the east is a large network of calcareous lakes and turloughs with associated fen, cut-away bog and calcareous marsh habitats. The complex contains many species of plant and animal that are found in areas of fluctuating water levels. The fen flora is well developed and large areas of Great Fen-sedge (*Cladium mariscus*) and Black Bog-rush (*Schoenus nigricans*), with a diverse complement of associated species occur. Some of the best and most extensive calcareous swamp fen communities in the country occur within this complex and further north-east around the shores of Lough Bunny. Between this lake and the Coole-Garryland turlough complex to the north east of the site, another area of oligotrophic limestone wetlands occurs. This type of ecosystem is now very rare in...
Europe and many of the habitats found are listed on Annex I of the EU Habitats Directive.

Many fine examples of turloughs occur within the site; Carran Turlough is an oligotrophic turlough *par excellence* with many interesting features in its flora and vegetation. It is rated as of international importance. Lough Atedaun is a good example of Burren wetland habitat. The aquatic plant communities are well developed and the rare, Red Data Book species, Mudwort (*Limosella aquatica*), occurs here.

Scrub cover is relatively good in this area of the Burren with large expanses of Hazel (*Corylus avellana*) intermixed with Spindle (*Euonymous europaeus*), Guelder Rose (*Viburnum opulus*) and Blackthorn (*Prunus spinosa*). An interesting scrub community of Alder Buckthorn (*Frangula alnus*), a Red Data Book species, Buckthorn (*Rhamnus catharticus*) and Shrubby Cinquefoil (*Potentilla fruticosa*), also a Red Data Book species, fringes the shores of some of the lakes and turloughs to the east.

Ballyeighter Wood to the east is an unusual scrub community on limestone with regenerating Oak (*Quercus* sp.) amongst Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*) and is an example of a woodland type that is rare in the Burren region. The eastern edge of Slieve Carran is dominated by steep cliffs and scree slopes over which Ash and Hazel wood is developed. This represents one of the few remaining woodland habitats in the Burren.

The East Burren Complex includes sites for many rare vascular plants and bryophytes (mosses and liverworts) and for several rare lichens and stoneworts.

In the east Burren wetlands Mute Swan and Whooper Swan occur in internationally important concentrations, while Wigeon, Lapwing, Dunlin, Black-tailed Godwit and Goldeneye are also very numerous. Also found in wetlands on the site (e.g. Lough Atedaun, Carran Turlough, Lough Aleenaun, Lough Inchiquin, Lough Bunny, Lough Cullaun, Muckanagh Lough) are Bewick's Swan, Teal, Mallard, Gadwall, Shoveler, Tufted Duck, Curlew, Golden Plover, Coot and Little Grebe. The site also supports a flock of Greenland White-fronted Geese. Several of these species are listed in the Red Data Book and on Annex I of the EU Birds Directive.

A nesting pair of Peregrine Falcon, a species listed on Annex I of the EU Birds Directive, occur on Glasgeivnagh Hill. The east Burren wetlands are frequented by Sparrowhawk, Kestrel and Hen Harrier, a rare species which is also listed on Annex I of the EU Birds Directive. Pine Marten and Otter have been recorded regularly within the site - both are listed in the Red Data Book as they are considered threatened in Europe, the latter also on Annex II of the EU Habitats Directive.

The site supports an internationally important population of Lesser Horseshoe Bats, with an estimated 400 individuals. There are two known nursery roosts, a transition roost and four known winter sites, the latter all in natural limestone caves. Pipistrelle and Long-eared Bats also occur. All of these species are listed in the Red Data Book,
the former also on Annex II of the EU Habitats Directive. The Lesser Horseshoe Bat is a small, delicate bat which is confined to six western counties, Mayo, Galway, Clare, Limerick, Kerry and Cork. It forages close to woodland and at the edges of water. The Irish population of this species is estimated to be about 12,000 individuals and may be the largest national population in Europe. The Pipistrelle Bat is the smallest bat to occur in Ireland and is the commonest and most widespread species. Pipistrelle Bats forage where small insects gather, in gardens, along hedgerows and trees, over ponds and along rivers. The Long-eared Bat is the second commonest bat in Ireland and is easily identified by its long ears which are nearly as long as its body. The Long-eared Bat forages in and along woodland where they glean insects off foliage. Since the bats moved into their present location, the roof has been replaced and timbers treated, but this does not seem to have disturbed the nursery colony. The surrounding habitat is ideal for the Lesser Horseshoe Bat’s foraging habitat, being a mixture of lake, river, woodland and hedgerows. A number of small caves in the surrounding countryside raises the possibility of a nearby hibernation site. The bat colony is of international importance because of the numbers of Lesser Horseshoe Bats roosting there during the summer months and because of the close proximity of suitable foraging areas and potential hibernation sites.

The site includes a large population of Marsh Fritillary, a species of butterfly listed on Annex II of the EU Habitats Directive. The site also supports the only known populations of Slow Worm (Anguis fragilis) in Ireland - this lizard is believed to have been introduced in about 1970. Arctic Char (Salvelinus alpinus), a Red Data Book fish species has been recorded from Lough Inchiquin.

Most of the site is grazed by cattle and sheep, and in some areas, particularly the uplands, by goats. Slieve Carran is a Statutory Nature Reserve, while some 750 square km within the region of Mullaghmore makes up the Burren National Park.

Clearance and intensification of agriculture has caused damage to some parts of the site. This threatens the heath and scrub communities and may cause eutrophication (nutrient enrichment) of the lakelands to the east. Drainage and land reclamation have occurred in places around the edges of wetlands, while some marginal fen areas have been afforested. Areas of agriculturally-improved land have been included within the site in order to protect the hydrology and nutrient status of the wetland system.

The East Burren Complex is of international scientific interest owing to the presence of fine examples of typical Burren habitats together with an oligotrophic wetland complex of lakes, turloughs, fen, cut-over bog and calcareous marsh. The Ballyeighter complex represents an excellent example of a nutrient-poor calcareous lake and fen system, of European significance. The only remaining woodland habitats to be found in the Burren occur within the site. The site contains twelve habitats that are listed on Annex I of the EU Habitats Directive and three species of plant and animal listed on Annex II of this Directive and, as such, is of major conservation significance. The occurrence of many rare plants and several rare mammals within the site adds considerably to its scientific and conservation value. The site is of high ornithological interest for the internationally and nationally important numbers of waterfowl that use it.
Conservation Objectives for Corofin Wetlands SPA [004220]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

- Tachybaptus ruficollis [wintering]
- Cygnus cygnus [wintering]
- Anas penelope [wintering]
- Anas crecca [wintering]
- Limosa limosa [wintering]
- Wetlands []

Citation:

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

SITE NAME: COROFIN WETLANDS SPA

SITE CODE: 004220

Corofin Wetlands SPA incorporates Inchiquin Lough, Lough Atedaun, Lough Cullaun and their associated calcareous wetlands. The site extends south-westwards to include the floodplain of the River Fergus to the west of Corofin, Co. Clare. The site contains some of the best areas of oligotrophic limestone wetlands to be found in the Burren.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Whooper Swan, Wigeon, Teal and Black-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetlands and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Corofin Wetlands SPA is of high ornithological importance for supporting nationally important numbers of Whooper Swan (127) and Black-tailed Godwit (329) - all figures are mean peaks for the five year period 1995/96 to 1999/2000. Nationally important populations of a further three waterbird species occur here, i.e. Little Grebe (87), Wigeon (2,828) and Teal (800).

Other species that occur include Mute Swan (223), Mallard (270), Gadwall (47), Shoveler (35), Tufted Duck (111), Coot (59), Golden Plover (56) and Curlew (222).

Corofin Wetlands SPA is of high ornithological importance and supports nationally important populations of five species: Little Grebe, Whooper Swan, Wigeon, Teal and Black-tailed Godwit. The regular presence of Whooper Swan and Golden Plover is of note as both species are listed on Annex I of the E.U. Birds Directive.
Conservation Objectives for Ballycullinan Lake SAC [000016]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
• [7210] * Calcareous fens with Cladium mariscus and species of the Caricion davallianae

Citation:

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

SITE NAME: BALLYCULLINAN LAKE

SITE CODE: 000016

Ballycullinan Lake is a calcareous lake situated approximately 2 km south of Corrofin. The site includes a series of smaller lakes to the north-east of Ballycullinan, i.e. Cragmoher Lough, Drumcavan Lough and Shanvally Lough. Large reedbeds, sedge swamp, stands of Saw Sedge (Cladium mariscus) and fen surround these lakes. Limestone pavement and scrub woodland occupy the northern part of the site.

This site is a candidate SAC for Cladium fen, a habitat listed on Annex I of the EU Habitats Directive.

The area of open water is of particular interest for the presence of the alga Cladophora sauteri. This forms spherical aggregations that sometimes become buoyant and float. Otherwise they are found on marl or rocks on the lake bed.

The large areas of reedbed around the lakes are composed of Common Reed (Phragmites australis) and Saw Sedge. Behind them, Bottle Sedge (Carex rostrata) is frequent, growing in marl deposits with stoneworts (Chara spp.) and the moss (Fontinalis antipyretica). The adjacent marsh vegetation is characteristic of a limestone lake and contains Yellow Water-lily (Nuphar lutea), Water Plantain (Alisma plantago-aquatica), Lesser Spearwort (Ranunculus flammula), Water Mint (Mentha aquatica), Marsh Ragwort (Senecio aquaticus), Tufted Forget-me-not (Myosotis laxa subsp. caespitosa), Greater Tussock-sedge (Carex paniculata), Water Dock (Rumex hydrolapathum) and the moss Calliergon giganteum.

In-flowing ditches allow Reed Canary-grass (Phalaris arundinacea), Brooklime (Veronica beccabunga), Yellow Iris (Iris pseudacorus) and Bog Stitchwort (Stellaria alsinae) to colonise in places.

On sloping limestone pavement, Hazel (Corylus avellana) scrub is the dominant vegetation, with Ash (Fraxinus excelsior), Holly (Ilex aquifolium) along with occasional Yew (Taxus baccata). The uncommon plant Dog’s Mercury (Mercurialis perennis) occurs in scrub woodland in the northern part of the site. A species rich calcareous grassland occurs in mosaic with the limestone pavement.

The site is of conservation value for its range of calcareous wetland habitats, particularly for the presence of Cladium fen. The occurrence of limestone pavement adds greatly to the importance of the site.

20.03.2003
Conservation Objectives for Ballyogan Lough SAC [000019]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
• [7210] * Calcareous fens with Cladium mariscus and species of the Caricion davallianae

Citation:

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

SITE NAME: BALLYOGAN LOUGH

SITE CODE: 000019

Ballyogan Lough is a complex of limestone pavement, scrub woodland, lake and fen situated about 10 km east of Corrofin, Co. Clare.

This site is a candidate SAC selected for *Cladium* fen, a habitat listed on Annex I of the EU Habitats Directive.

The site lies within a wedge shaped basin with low hills on both sides. It is oriented on a north-east/south-west axis. The south-west end is largely dominated by scrub and limestone pavement while the north-east is largely fen. A bog road divides this fen from Ballyogan Lough, which lies in the centre of the site. The dominant vegetation around the lake margin is Common Reed (*Phragmites australis*), with large stands of the Saw Sedge (*Cladium mariscus*) nearby. Black Bog-rush (*Schoenus nigricans*) is abundant some distance from the water, together with Bog-myrtle (*Myrica gale*), Purple Moor-grass (*Molinia caerulea*) and several plant species of note including Marsh Helleborine (*Epipactis palustris*), Dioecious Sedge (*Carex dioica*), Blunt-flowered Rush (*Juncus subnodulosus*) and Lesser Tussock-sedge (*Carex diandra*). Adjacent damp fields contain frequent Heather (*Calluna vulgaris*). Further away from the lake, on the west side of the bog road, this fen-type vegetation gives way to extensive, abandoned cutover bog. Although some transitional areas are marshy, drainage to parts of this area at the north-east end of the site has facilitated the spread of drier, heath plants such as Gorse (*Ulex europaeus*).

The scrub and limestone pavement, which is situated in the southern part of the site, is dominated by Hazel (*Corylus avellana*) and Ash (*Fraxinus excelsior*). Other plants of note include Yew (*Taxus baccata*) and Spindle (*Euonymus europaeus*) both of which are relatively rare on site. Cotoneaster (*Cotoneaster microphyllus*) is frequent on the pavement where it has become fully naturalised.

The main threats to the site are from agricultural improvement, including drainage of wetlands and scrub removal from the limestone pavement areas. The site is nevertheless of conservation value for its diverse range of habitats, and notably the presence of *Cladium* fen.

25.03.2003
Conservation Objectives for Moyree River System SAC [000057]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
- [1303] *Rhinolophus hipposideros*
- [1355] *Lutra lutra*
- [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- [7230] Alkaline fens
- [8240] * Limestone pavements
- [8310] Caves not open to the public

Citation:

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

SITE NAME: MOYREE RIVER

SITE CODE: 000057

The Moyree River is situated in a sheltered valley on the south-eastern fringe of the Burren, Co. Clare. Ballyvaughan Lough lies to the north of Moyree with Dromore Woods and Lough to the south-west. The site contains good examples of four habitats listed on Annex I of the EU Habitats Directive, namely limestone pavement, floating river vegetation, alkaline fen and caves.

The slow-moving river meanders through a low-lying valley sheltered on the east by gently sloping limestone outcrops and Ash (*Fraxinus excelsior*) woodland and to the west by low undulating drumlin hills. The soil in the valley may be broadly classed as gley type with alluvial soils, fen peat and marl present. The river flows in a south-westerly direction and ultimately disappears underground. The depth of the stream is on average 1.5m (0.3-2m).

Where the stream first emerges, a small, relatively eutrophic area of flood plain grassland is developed over alluvial soils. Further downstream the soils are fen peat and marl, and fen vegetation dominated by the Black Bog-rush (*Schoenus nigricans*) occurs within the floodplain of the river. The stream is bordered by floating scraw, and pool areas, eroding and accumulating banks and meandering stretches occur. Tall Reeds (*Phragmites australis*) fringe the river; the open water supports Yellow Water-lily (*Nuphar lutea*), Bog Bean (*Menyanthes trifoliata*) and Common Duckweed (*Lemna minor*).

Low Hazel (*Corylus avellana*) has developed over much of the limestone pavement area south-east of the river. Bare limestone pavement interspersed with species-rich calcareous grassland occurs regularly to the south. Common species found here include Burnet Rose (*Rosa pimpinellifolia*), Wood Sage (*Teucrium scorodonia*), Blue Moor-Grass (*Sesleria albicans*), with occasional Juniper (*Juniperus communis*) scattered throughout.

The limestone in the far north and south of the river supports a mature Ash woodland with Willow (*Salix* spp.), Holly (*Ilex aquifolium*), Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymus europaeus*). Hazel reaches a significant height in parts of the south-west to be considered as woodland.

This site is an internationally important summer roosting and hibernation site for Lesser Horseshoe Bat, a species listed in Annex II of the EU Habitats Directive. The bats hibernate in a series of natural limestone river caves in the site. The caves are short, low and wet passages that have developed on the water table below limestone ridges. Several other mammal species frequent the Moyree River valley, including Otter and Pine Marten. Both of these species are listed in the Red Data Book as threatened in Europe. The secluded nature of the river valley is ideal for sheltering...
wildfowl, especially teal and mallard. The rare Hen Harrier is a regular visitor to the area.

The site is threatened, to varying degrees, by agricultural intensification, including water pollution, fertilisation, over-grazing and land reclamation. Afforestation also threatens the integrity of the site. The bats are particularly vulnerable to disturbance and to rock falls which might block the entrances to their roosting/hibernation site.

This site is of international importance owing to the presence of a colony of Lesser Horseshoe Bats in a network of underground caves. The Irish population of 12,000 animals is thought to be the largest national population in Europe. After the Caher River in the north-west Burren, the Moyree River is the best example of a karstic river in the country. The floating scraw vegetation is unusual as this type of habitat is normally destroyed by dredging operations. The river exhibits an excellent example of nutrient gradients associated with silt deposition. Fine examples of typical Burren habitats including limestone pavement, a priority habitat on Annex I of the EU Habitats Directive, and its associated calcareous grasslands are also of major conservation significance.

29.08.2001
Conservation Objectives for Ballyalla Lake SAC [000014]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
• [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation

Citation:

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

SITE NAME: BALLYALLIA LAKE

SITE CODE: 000014

Ballyallia Lake is a relatively small, shallow lake situated on the River Fergus approximately 4 km north of Ennis, Co. Clare. It is a naturally eutrophic lake, a habitat listed on Annex I of the EU Habitats Directive. The lake, which is base-rich with relatively clear water, is set amongst heavily farmed land to the north and south, with a low-lying flood plain of wet grassland and rough grazing to the west.

Habitat and species diversity around the lake is low and only a few emergent plants are found e.g. Common Club-rush (Scirpus lacustris) and Common Reed (Phragmites australis). Lough Girroga, about 1 km to the south of Ballyallia, is included in the site. It is a small lake with a high diversity of vegetation communities and plant species. Here there is a well-developed reed fringe with a fen-like community of Great Fen-sedge (Cladium mariscus), Common Club-rush, Purple Moor-grass (Molinia caerulea) and the less common Black Bog-rush (Schoenus nigricans). A well-established Hazel (Corylus avellana) woodland slopes down to the northern lakeshore.

Ballyallia Lake is also a Special Protection Area for birds and a Wildfowl Sanctuary. The lake and the flood plain to the west hold nationally important numbers of Shoveler (120), Wigeon (1200), Coot (600), Mallard (600) and Gadwall (76). Significant numbers of Whooper Swan (80), an Annex I species under the Birds Directive, also use the site. Other regular wintering species include Teal (170), Lapwing (1100), Tufted Duck (188), Pintail (35) and Little Grebe (38) (all counts are maxima from 94/95 - 95/96).

Agricultural improvement to the lands surrounding the lakes in the site poses a significant threat to the water quality of the system.

20.11.1997
Conservation Objectives for Ballyallia Lough SPA [004041]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:
- **Anas penelope** [wintering]
- **Anas strepera** [wintering]
- **Anas crecca** [wintering]
- **Anas platyrhynchos** [wintering]
- **Anas clypeata** [wintering]
- **Fulica atra** [wintering]
- **Limosina limosa** [wintering]
- **Wetlands**

Citation:

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

SITE NAME: BALLYALLIA LAKE WILDFOWL SANCTUARY SPA

SITE CODE: 004041

Ballyallia Lake is a relatively small, naturally eutrophic, lake set in Carboniferous limestone. The site is located on the River Fergus, a little north of Ennis town, Co. Clare. It is a shallow system but can rise substantially during winter floods. Habitat and species diversity around the lake is fairly low and only a few emergent plants are found, such as Common Club-rush (Scirpus lacustris) and Common Reed (Phragmites australis). A low-lying flood plain of wet grassland and rough pasture grazing land to the west is included within the site. Substantial areas of improved grassland, used by feeding waterfowl, are also included. Intensively farmed land occurs to the north and south. The lake is used for a range of recreational activities.

The site supports a good diversity of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. Seven of the species have populations of national importance (all figures given are average peaks for 4 of the 5 winters between 1995/96-1999/00): Little Grebe (37), Wigeon (1,469), Gadwall (68), Teal (863), Shoveler (288), Coot (331) and Black-tailed Godwit (278). Other species which occur include Whooper Swan (76), Mallard (502), Pintail (18), Pochard (33), Tufted Duck (153), Lapwing (930), Mute Swan (28), Grey Heron (11), Cormorant (13), Greylag Goose (9) and Black-headed Gull (443). The Shoveler population is the largest in the country (9.6% of the national total), while that of Gadwall is also very notable (3.4% of total).

The quality of the habitat for the birds is good and the site provides both feeding and roost sites for them. Some of the birds, however, and especially Black-tailed Godwit, commute to the nearby River Fergus-River Shannon estuary.

The site is a Wildfowl Sanctuary and there are no imminent significant threats to the wintering bird populations. However, the site is a popular recreational area and an increase in such activities could cause significant disturbance. Agricultural intensification within the site could have detrimental effects for some species, while intensification outside of the site could affect water quality.

This is an important site for wintering waterfowl, having seven species with populations of national importance, those of Shoveler and Gadwall being of especial note. Also of importance is the occurrence of Whooper Swan, a species that is listed on Annex I of the E.U. Birds Directive.
Conservation Objectives for Ballycullinan, Old Domestic Building SAC [002246]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
- [1303] Rhinolophus hipposideros

Citation:

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

SITE NAME: BALLYCULLINAN, OLD DOMESTIC BUILDING

SITE CODE: 002246

This site consists of a derelict dwelling and a number of the surrounding fields east of Ballycullinan Lough in County Clare. It is a breeding site of the Lesser Horseshoe Bat (*Rhinolophus hipposideros*), a species listed on Annex II of the EU Habitats Directive. The bats roost in the roof space and gain access through a garrett window.

The building was formerly thatched but is now covered with galvanised sheeting. The number of bats using the site has gradually increased and in June 1999 115 individuals were counted, making it a population of international importance.

A small area of Hazel (*Corylus avellana*) woodland and extensive hedgerows have been included in the site as they provide ideal foraging habitat for the bats.

There are no immediate threats facing the site.

14.6.1999
Conservation Objectives for Old Farm Buildings, Ballymacrogan SAC [002245]

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

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

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

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

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

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

- [1303] *Rhinolophus hipposideros*

Citation:

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

SITE NAME: OLD FARM BUILDINGS, BALLYMACROGAN

SITE CODE: 002245

This site, which is west of Ruan in County Clare, consists of a farmyard which contains a series of stone sheds. The Lesser Horseshoe Bat (*Rhinolophus hipposideros*), a species listed on Annex II of the EU Habitats Directive, breeds here in two of the buildings. The Vincent Wildlife Trust has carried out work on one of these sheds to improve the roosting conditions for the bats. The shed has been re-roofed with slates and the doors and windows have been secured leaving access for the bats.

Approximately 80 individual bats were counted on emergence in June 2000, although numbers have exceeded 100 (threshold for international importance) in the past.

There appear to be no immediate threats facing the site.

25.9.2000

Clare County Council

Attachment F.1.6

Toormore, Ruan
Conservation Objectives for Toonagh Estate SAC [002247]

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

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

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

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

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

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:
- [1303] *Rhinolophus hipposideros*

Citation:

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

SITE NAME: TOONAGH ESTATE

SITE CODE: 002247

This site consists of part of a former estate 5km north-west of Ennis, County Clare. A stables provides a nursery roost for the Lesser Horseshoe Bat (*Rhinolophus hipposideros*), a species listed on Annex II of the EU Habitats Directive. The bats roost in the roof space and gain access through gaps in the lower sections of the building.

The population size has been increasing since the upper storey windows of the building were blocked. Approximately 100 individuals have been counted in recent years.

An area of parkland which contains some mature trees and hedgerows is included in the site as this provides ideal foraging habitat for the bats.

There are no immediate threats to this site.

27.9.2000
Attachment F.1.5 Map 1 showing Toormore (Ruan) Agglomeration, location of SAC, SPA and nNHAs within 5 Km Buffer Zone and Pouladower Inner Protection Zone

Dated: April 2013
WASTE WATER DISCHARGE LICENSING

APPROPRIATE ASSESSMENT for TOORMORE (RUAN) WWTP

1 Introduction

This “appropriate assessment” (AA) is undertaken in accordance with the Wastewater Discharge Authorisation Note on Appropriate Assessments, issued by the EPA. Due regard is given to the EC Guidance “Managing Natura 2000 Sites”. In compliance with the requirements of Article 6 of the directive, and following the guidelines, this AA has been structured in stages as set out hereunder:

Stage 1 Screening:

This includes a description of the activity and the discharge; identification of the Natura 2000 sites potentially affected; identification of cumulative impacts on the Natura 2000 sites in the vicinity of the discharge; assessment of the significance of the impacts identified on the site integrity.

Stage 2 Appropriate Assessment

This includes a description of elements of the Natura 2000 site which will be considered further; a description of significant impacts on the conservation features of the site likely to occur from the discharge; and, recommendations regarding necessary measures to be taken to ensure the protection of the site and its conservation objectives.

Stage 3 Assessment of Alternatives

This examines the current provisions regarding the treatment plant and its discharge and future provisions to ensure the ongoing protection of the Natura 2000 sites.

Stage 4 Assessment where no alternatives exist

This examines reasons (if they exist) of overriding public interest for continuation of a discharge which has a negative impact on the Natura 2000 sites.
2 Stage 1 Screening:
Is the Toormore (Ruan) WWTP directly connected with or necessary to the management of the site? No

2.1 Description of the treatment plant
The wastewater treatment plant (WWTP) associated with the Toormore (Ruan) agglomeration is located in the Townland of Toormore, County Clare. The WWTP serves a population equivalent of 93. The WWTP facility serving the Toormore housing development was upgraded in 2005 to provide secondary treatment followed by passing the discharge through a sand polishing filter and ultra-violet (UV) system prior to discharge to a percolation area. The groundwaterbody in this area is listed as waterbody SH_G_080 in the Shannon River Basin Management Plan.

The layout of the Toormore (Ruan) WWTP site is provided in Attachment C.1.1 to the application. An aerial view of the wastewater treatment facility, including the location of the outfall pipe and the Toormore (Ruan) agglomeration is provided as Attachment B.1.

2.2 Description of the Natura 2000 site
A number of Natura sites are located in proximity to the Toormore (Ruan) WWTP site as described in Table 1 below. A map identifying the Natura sites within a 5 kilometer radius of the Toormore (Ruan) WWTP is provided as Attachment F.1.5 and a full description of the protected sites is provided as Attachment F.1.6 to the application. The site in closest proximity to the Toormore (Ruan) WWTP is Dromore Woods and Loughs SAC situated 1km to the east. Other protected sites in the vicinity of the Toormore (Ruan) WWTP include the East Burren Complex SAC and Corofin Wetlands situated 1.6km to the north-west of the site, Ballyogan Lough SAC and the Moyree River System SAC 3-4km to the north-east, Ballyculinin Lough SAC 3.3km to the west and Ballyalla Lough SAC and SPA 5.1km to the south. Only those sites within the 5 kilometer radius of the Toormore (Ruan) WWTP site are listed in Table 1 below.

Three other SAC sites located within the 5 km radius of the WWTP are designated as SAC sites, namely 1. Old Farm Buildings, Ballymacrogan; 2. Ballyculinin, Old Domestic Buildings and 3. Toonagh Estate. The feature of interest for all three sites being the Lesser horseshoe bat, a species listed on Annex II of the EU Habitats Directive.

The protected sites identified in Table 1 were selected because of their conservation status, and ability to support a diverse range in habitats and flora and fauna species some of which are very rare. The main habitats encountered within the SAC sites are limestone pavement and associated calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scrub, dry broad-leaved woodlands, a network of calcareous grasslands, caves, scr
lakes, turloughs and fens, wetlands and cut-away bog. The protected fauna that are found within the SAC sites includes the Otter, lesser horseshoe bat and Marsh Fritillary. Two SPA sites are included within the 5km buffer zone and are considered important as sites for both feeding and roost sites, especially for wintering wildfowl e.g. Shoveler, Gadwall and Whooper Swan which is listed on Annex I of the EU Birds Directive.

The main threats to the sites listed are those from landuse activities such as land reclamation and land drainage for agricultural purposes, clearance and intensification of agriculture.

Table 1 Listed of Protected Sites

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Protected Site</th>
<th>Code</th>
<th>Distance km</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dromore Wood and Lough</td>
<td>SAC</td>
<td>000032</td>
<td>1.0</td>
<td>East of site</td>
</tr>
<tr>
<td>East Burren Complex</td>
<td>SAC</td>
<td>001926</td>
<td>1.6</td>
<td>West North-West</td>
</tr>
<tr>
<td>Corofin Wetlands</td>
<td>SPA</td>
<td>004220</td>
<td>3.2</td>
<td>West North-West</td>
</tr>
<tr>
<td>Ballycullinan Lough</td>
<td>SAC</td>
<td>000016</td>
<td>3.2</td>
<td>West</td>
</tr>
<tr>
<td>Ballyogan Lough</td>
<td>SAC</td>
<td>000019</td>
<td>3.24</td>
<td>North-east</td>
</tr>
<tr>
<td>Moyree River System</td>
<td>SAC</td>
<td>000057</td>
<td>3.9</td>
<td>North-east</td>
</tr>
<tr>
<td>Ballyallia Lake</td>
<td>SAC &amp; SPA</td>
<td>000014 &amp;</td>
<td>5.1</td>
<td>South</td>
</tr>
<tr>
<td>Ballycullinan Old Domestic</td>
<td>SAC</td>
<td>002246</td>
<td>3.3</td>
<td>West South-west</td>
</tr>
<tr>
<td>Old farm Building</td>
<td>SAC</td>
<td>002246</td>
<td>0.7</td>
<td>South-west</td>
</tr>
<tr>
<td>Ballymacrogan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toonagh Estate</td>
<td>SAC</td>
<td>002247</td>
<td>5.1</td>
<td>South</td>
</tr>
</tbody>
</table>

2.3 Description of Protected Sites

The River Fergus is designated a salmonid water under the European Communities (Quality of Salmonid Waters) Regulations (S.I. 293 of 1988). While best known as a game fishery, the Fergus is also a coarse fishery and also contains Perch and Pike.

2.4 Identification of potential impacts

Only those features of the operation of the wastewater treatment plant or the discharge, which have the potential to impact on the interests and conservation objectives of the SAC and SPA sites listed in Table 1 above are considered. A number of factors were examined and then dismissed, or carried forward for appropriate assessment, as relevant. The main issue examined in relation to potential impact on the designated sites is the water quality associated with the area of the discharge from the WWTP.
The potential impacts on water quality associated with the wastewater treatment plant are:

- Organic pollution of the receiving waters with untreated or poorly treated sewage.
- Microbial pollution of the receiving waters to the extent that habitats, protected species or populations would suffer direct or indirect effects.
- Pollution of the receiving waters by other pollutants associated with wastewater (organic compounds or heavy metals).

Deterioration in water quality could affect some habitats or species for which the site has been designated, either directly by impacting on water quality or indirectly by impacting on the food chain for various species of flora or fauna.

The discharge is made to a percolation area and ultimately to the Ennis Ground Water Body Code: Sh_G_080. The existing status of the groundwater body is described as “Poor” status. The status report is provided in Attachment F.1.1 to this application. Due to the limestone bedrock and karstified flow regime, hydrology in the area is complex with groundwater closely interlinked with surface waters, hence account must also be taken of the impact from the discharge on water quality in the River Fergus system. The most recent water quality status of the River Fergus or Q rating (EPA data) for the River Fergus is described in Table 2 below, and shows the water quality at Nutfield Bridge, over 4 km downstream of Ruan as moderate i.e. Q 3-4.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Location</th>
<th>Q rating</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0300</td>
<td>Corofin Br.</td>
<td>3-4</td>
<td>Moderate</td>
</tr>
<tr>
<td>0400</td>
<td>Addroan Br.</td>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>0500</td>
<td>Nutfield Br.</td>
<td>3-4</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Findings from a water trace study\(^2\) carried out in 2012, from Moymore quarry (approximately 1.5 km south of Ruan) confirmed water flow in the area is in a north to south direction, where the flow rate is rapid and all water from Moymore quarry flowing to Pouladower Springs (located immediately to the north-west of Ballyallia Lough to the south). A copy of the report is provided in Attachment F.1.3.

\(^2\) Drew, D. July 2012, Water Tracing from Moymore Quarry (Ruan) County Clare

2.5 Elements of the project which (alone or in combination) with other plans or projects have the potential to have a significant effect on the site.

In so far as discharges to ground or surface waters are concerned, it is critical that discharges are controlled and managed to ensure the impact of any discharge, or combination of discharges does not
• Give rise to any reduction in the diversity of floral and faunal species
• Cause a change in the integrity of the principal community types;
• Impact on water quality to the extent that the integrity of the principal community types are affected; and
• Give rise to changes in the extent of any habitat or any population such as to compromise or threaten the integrity of any habitat or the long term survival of species associated with that habitat.

The discharge from the Toormore (Ruan) WWTP is made ultimately to the Ennis Ground Water Body but is not located within the boundary of a Natura site. However it has the potential to impact on sites adjacent to the discharge as a result of the complex karst hydrology in the area. The National Grid Reference for the Primary Discharge Point P(GW1) prior to discharge to the percolation area is E133218; N186789. The discharge from the Toormore (Ruan) WWTP, as described in the certificate application, constitutes the element of the project, which has potential for a significant effect on the adjacent designated site. The WWTP was upgraded in 2005 to include secondary treatment of the waste waters in addition to sand filtration and ultra violet (UV) treatment before discharge to the percolation area. This provides significant protection to the status of the receiving waters from the discharge. Monitoring data for the effluent discharge is not available however during the course of preparing the application monitoring of the discharge was carried out and the results of the survey are provided in tables D.1(i) via the web based link: http://78.137.160.73/epa_wwd licensing/. Other discharges which can be identified as having potential to have a significant effect on the site include:

2.5.1 Discharges to the Ennis Groundwater body or to the River Fergus system upstream of the discharge point arising from the catchment area. The impact of such discharges has been taken into account in the assessment of water quality in the vicinity of the discharge from the wastewater treatment facility.

2.5.2 Discharges to Ennis Groundwater body from housing not associated with the Toormore (Ruan) sewer network, but within the catchment area.

2.5.3 Stormwater discharges from the roads network in the immediate catchment of Toormore (Ruan).

2.5.4 Diffuse agricultural discharges to the main surface water channels which discharge to the River Fergus system.

These discharges, which are diffuse in nature, are not considered to present a significant deterioration in water quality in the area or such as would compromise the conservation status of the designated site, or any protected species within the site.

Other plans and projects considered to have potential to have "in combination" effects are listed hereunder:
• Clare County Development Plan 2011 - 2017 (for which an appropriate assessment, as required under Article 6 of the Habitats Directive has been undertaken).
• North Clare Local Area Plan 2011 - 2017 (for which an appropriate assessment, as required under Article 6 of the Habitats Directive has been undertaken).
• County Clare Heritage Plan 2011 – 2017 July

In so far as the impact of the combined discharges can be assessed by the water quality status report as provided in Attachment F.11 to the application there is no evidence of any compromised water quality adjacent to Toormore (Ruan) WWTP or in combination with existing discharges from developments. Development control measures will continue to address the protection of this site and maintain the conservation status of the designated species associates with the site.

2.6 Assessment of Significance of the discharge

A number of designated Natura sites are situated in proximity to the effluent discharges point and have been selected for their conservation status on the basis of both Annex I habitats and Annex II mammals (EU Habitats Directive) and of Annex I Bird species (Birds Directive). As there is no evidence of a significant impact or deterioration in water quality in the immediate catchment of the discharge from Toormore (Ruan) WWTP, it is considered that there is no impact associated with the discharge on the designated habitats, flora and fauna or on the feeding grounds of any birds in the area.

Referring to the L8/08 Circular, the following queries are raised and answered:
1. Is the development in or on the boundary of an SAC/NHA etc No
2. Will nationally protected species be directly impacted? No
3. Is the development a surface water discharge or downstream of a conservation site with water dependent qualifying habitats/species No
4. Is the development a groundwater discharge/abstraction? Yes
5. Is the development in the surface water or groundwater catchment of salmonid waters? Yes
6. Is the treatment plant in an active/former floodplain? No
7. Is the development a surface water discharge to/from marine waters and within 3km of a marine conservations site? No
8. Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of conservation interest or habitats of protected species? **No**

L8/08 states that if the conclusion of the screening process above is to “Assess Impacts” then the project must be referred to the DEHLG Development Application Unit. As the conclusion of the screening process is that there is no discernable impact, the application has not been referred to the DEHLG Development Application Unit.

2.7 Conclusion
A screening process was undertaken to determine the potential impact, if any, of the Toormore (Ruan) WWTP discharge on the SAC and SPA sites situated in proximity to Ruan. No impact linked to the discharge from the treatment plant is observed or considered likely on the species of qualifying interest associated with the designated sites taking account of the quality status of the receiving waters in the vicinity of the discharge.
3 Stage 2 Appropriate Assessment

3.1 Introduction
The potential impacts resulting from the effluent discharge from the WWTP at Toormore (Ruan) are discussed in relation to the conservation objectives of the designated Natura sites located adjacent to the WWTP site. Conservation management plans are published for the sites. The advice from the National Parks and Wildlife Service for the sites is to ensure that the features of interest are maintained or restored to favourable conservation condition for Annex I habitats and/or Annex II species for which the site has been selected. Examples of significant effects include loss of habitat area, fragmentation of habitat, disturbance to species using the site and changes in water resources or quality.

3.2 General Description
A number of Natura sites are located in proximity to the Toormore (Ruan) WWTP site. A map identifying the Natura sites within a 5 kilometer radius of the WWTP at Toormore (Ruan) is provided as Attachment F.1.5 and a full description of the protected sites is provided as Attachment F.1.6 to the application. The site in closest proximity to the WWTP at Toormore (Ruan) is Dromore Woods and Loughs SAC Site Code: 000032, situated 1km to the east. The main features of interest of the site are Annex I habitats, natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation, Hydrophilous tall herb fringe communities and limestone pavements and Annex II mammals, the Otter and lesser horseshoe bat.

Other protected sites in the vicinity of the WWTP at Toormore (Ruan) include the East Burren Complex SAC Site Code: 001926 and Corofin Wetlands SPA Site Code: 004220 situated 1.6km and 3.2 Km respectively to the north west of the site. The main features of interest of the SAC site includes limestone pavement and associated calcareous grasslands, including hay meadows, Juniperus communis formations, alpine and boreal heaths, caves, a network of wetlands and lakes such as calcareous hard oligomesotrophic waters with benthic vegetation, turloughs and calcareous fens and petrifying springs with tufa formations. The protected fauna that are found within the site includes the Otter, lesser horseshoe bat and Marsh Fritillary. There is significant overlap between the two SAC and SPA sites. The Corofin Wetlands site is of high ornithological importance for supporting nationally important numbers of Whooper Swan (Annex I) and Black-tailed Godwit as well as Little Grebe, Wigeon and Teal.

Both Ballyogan Lough SAC, Site Code: 000019 and the Moyree River System SAC, Site Code: 000057 are situated approximately 3-4km to the north-east of Ruan. The feature of interest for the Ballyogan site is Calcareous fens with Cladium mariscus and the main feature of interest for the Moyree River system site includes limestone pavement, water courses of plain to mountain levels with Ranunculion fluitantis and Callitricho-Batrachion
vegetation, Alkaline fens, caves (all Annex I) and Annex II species the Otter and the Lesser horseshoe bat.

The feature of interest for the Ballycullinan Lough SAC, Site Code: 000016 located 3.3km to the West South-west is Calcareous fens with Cladium mariscus and for the Ballyallia Lough SAC Site Code: 000014 and SPA Site Code: 004041 located 5.1km to the south, it is natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation. The site is also an SPA site and supports a wide diversity of wintering wildfowl, some of which have populations of national importance.

Three other SAC sites located within the 5 km radius of the WWTP are designated as SAC sites, i.e. Old Farm Buildings, Ballymacrogan Site Code: 002245; Ballycullinan, Old Domestic Buildings Site Code: 002246 and Toonagh Estate Site Code: 002247. The feature of interest for all three sites being the Lesser horseshoe bat, a species listed on Annex II of the EU Habitats Directive.

The main threats to the sites listed are those from landuse activities such as intensification of agriculture, land reclamation and land drainage for agricultural purposes and clearance.

3.2.1 Water Quality

It is important that the listed water quality habitats are maintained for the instream invertebrate and plant communities, and for fish. This will also ensure the protection of the feeding areas for bird life at the sites and for protected fauna.

The main consideration regarding the impact of the discharge from the WWTP at Toormore (Ruan) in relation to protection of the conservation status of this site is to ensure the ongoing diversity of aquatic species and plant communities, by ensuring the quality of the waters affected by the discharge are maintained at a status which would not impact on species diversity at the sites or the feeding grounds of the birds. Reference is made to a Water Tracing Study carried out in 2012, when water from Moymore quarry (approximately 1.5 km south of Ruan) which traced quarry water to Pouladower spring (situated immediately to the north-west of Ballyallia Lough to the south), indicating the predominant ground water flow is from north to south. A copy of the report is provided in Attachment F.1.3.

Water quality data in the vicinity of the discharge is not available however because the discharge has been ongoing for a period of time and it is being treated to a high standard (including sand filtration and UV treatment), it is not considered that the discharge of treated wastewater from the WWTP at Toormore (Ruan) will adversely affect the freshwater habitats or flora and fauna.
3.2.2 Organic Pollution
When untreated or poorly treated sewage effluent is introduced to a water body, living conditions for flora and fauna can be affected. Increased turbidity in the water affects light penetration, which reduces the capacity of the water to support photosynthesizing plants. Reduced oxygen levels can also have a significant damaging effect for all aquatic species. Monitoring data of the discharge or of the receiving waters is not available, however monitoring of the discharge undertaken in May 2013, in preparation of the certificate application, indicates non-compliance with the Urban Waterwater Treatment Regulations, 2001 – 2010. Corrective action to address the non-compliances is being taken. It is considered that organic pollution is not giving rise to damage to the aquatic habitats when account is taken that further treatment is provided within the percolation area, the low volume of emissions from the WWTP and that the discharge has been ongoing for a long period.

3.2.3 Eutrophication
Eutrophication is the enrichment of waters beyond natural levels and in aquatic systems results in loss of biodiversity and degradation of aquatic habitats. Taking account of the known water flowpath, i.e. north to south, as assessment of water quality on Ballyallia Lough is used as an indication of impact from the WWTP discharge at Toormore (Ruan). The standard set for Phytoplankton measured as Chlorophyll a, in the European Communities Environmental Objectives (Surface Waters) Regulations 2009 indicates that Ballyallia Lough achieves good status.

3.2.4 Other potential pollutants
A range of organic compounds with the potential to pollute surface waters are present in municipal wastewaters from densely populated, industrial agglomerations. The sources of these chemicals are landfills, industrial effluents, medical products and personal hygiene chemicals. When municipal wastewater is treated in a conventional sewage treatment plant the average removal of these compounds is in the range 75-95%. There is no industrial component or landfill discharge or other source of organic pollution, or heavy metals in the Toormore (Ruan) agglomeration. When discharges from the Toormore (Ruan) WWTP were assessed against the limit values provided under the European Communities Environmental Objectives (Surface Waters) Regulations 2009, results of monitoring indicated compliance with the limit values (See Tables D.1 (i) (b) and D.1 (ii) (C) in the application).

3.2.5 Estimated impact of wastewater discharges from Toormore (Ruan) WWTP on receiving water quality
The impact of the discharge from the Toormore (Ruan) agglomeration on the nutrient status of receiving waters is the main element of consideration in this report. The nutrient
input is the most significant element for consideration in the protection of the conservation status of the various habitats and species listed for protection in the SAC and SPA sites. Water quality status is used as the underlying common denominator to define the potential impact of this discharge on the waters in the area. The provision of a upgraded WWTP at Toormore (Ruan) in 2005, which included sand filtration and UV treatment, provided improvement in the level of treatment at the plant and in the quality of the discharge, therefore providing a corresponding improvement and protection in the status of the receiving waters.

It is considered that the impact of the discharge, in combination with the other existing discharges in the area is not giving rise to any reduction in the water quality status, and does not compromise the achievement of the conservation objectives for the protected areas. This includes any impact on Annex 1 habitats, Annex II flora or fauna and on the feeding grounds of Annex I (Birds Directive) species associated with the sites and on the conservation objectives of the sites.

3.2.6 Analysis of in combination effects
The discharges from the WWTP at Toormore (Ruan) and the diffuse discharges arising from the catchment of the designated sites are taken into account in the assessment of water quality the receiving waters. There is no indication that the operation of the WWTP at Toormore (Ruan) is having an adverse impact on water quality in the designated sites or an adverse impact on the conservation status of the sites situated adjacent to Ruan.

3.3 Mitigation Measures
The principal mitigation measure set out in the application is the ongoing management of the Toormore (Ruan) WWTP to ensure compliance with the Urban Waste Water Regulations 2001 – 2010. The full description of the treatment works is provided in the certificate application. The upgrading of the WWTP in 2005 provided for a better quality discharge. The upgrade to WWTP included secondary treatment, sand filtration and UV treatment before final discharge to a percolation area and can be included as a mitigation measure.

Clare County Council adopts a multi-disciplinary approach to the consideration of all applications for development in the Ruan catchment area or downstream waterbodies. The Clare County Development Plan and North Clare Local Area Development Plan also endorses the protection of these areas and the overall protection of the adjoining SAC and SPA sites in the designation of land use. All development liable to impact either directly or indirectly on a designated site is required to undertake an initial screening of potential impacts, leading to a Habitats Directive Assessment if required.

Table 2 hereunder summarises the potential impact arising from discharges from the Toormore (Ruan) agglomeration on the protected sites.
Table 2: Assessment of impact of discharges from Toormore (Ruan) agglomeration on adjacent Designated Sites

<table>
<thead>
<tr>
<th>Description</th>
<th>Impact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of habitat area</td>
<td>The discharge from the Toormore (Ruan) agglomeration has been ongoing for many years. The WWTP was upgraded in 2005. No reduction in habitat area has been linked to the discharge, and the water quality status does not indicate any significant impact on receiving waters quality in the area.</td>
</tr>
<tr>
<td>Disturbance to key species; plants</td>
<td>None</td>
</tr>
<tr>
<td>Habitat or species fragmentation</td>
<td>No priority habitat is identified in the vicinity of the discharge.</td>
</tr>
<tr>
<td>Reduction in species density</td>
<td>No reduction in species density is anticipated.</td>
</tr>
<tr>
<td>Changes in key indicators of conservation value</td>
<td>The discharge from the Toormore (Ruan) agglomeration has not altered the existing conservation status of the sites. No change in the level or composition of the discharge is anticipated. The WWTP was upgraded in 2005 and this has had a positive impact on the conservation status of the site.</td>
</tr>
<tr>
<td>Effects of climate change</td>
<td>None</td>
</tr>
<tr>
<td>Describe any likely impacts on the Natura 2000 site as a whole in terms of any interference with the key relationships that define the structure of the site;</td>
<td></td>
</tr>
<tr>
<td>Interference with the key relationships that define the structure of the site;</td>
<td>The location of the discharge from the agglomeration is in place for many years and there are no proposals in place to make alterations in any way. Loss of species will not occur as a result of the discharge from the WWTP facility.</td>
</tr>
<tr>
<td>Fragmentation</td>
<td>Fragmentation of the site has not been reported as a result of the existing discharge.</td>
</tr>
<tr>
<td>Disruption and disturbance</td>
<td>No change to the drainage regime is currently proposed. No bypassing of the treatment works is proposed at any time.</td>
</tr>
<tr>
<td>Describe any likely impacts on the Natura 2000 site as a whole in terms of any interference with the key relationships that define the structure of the site;</td>
<td></td>
</tr>
<tr>
<td>Change to key elements of the site (e.g. water quality etc.)</td>
<td>Water quality is not currently showing evidence of impact from the existing discharge. The loading to the treatment plant in terms of population served and influent monitoring will be monitored. No potentially polluting substances will be permitted to discharge to off-site surface water or storm drains. If observations of contamination occur, an immediate investigation will be carried out to isolate the source, measures will be put in place to reduce or eliminate the contamination to the environment and it will be reported to the Licensing Authority.</td>
</tr>
<tr>
<td>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or</td>
<td>This discharge has no overall perceivable impact on the designated site as it now exists.</td>
</tr>
</tbody>
</table>
4 Stage 3 Alternatives
The appropriate assessment presented has not identified adverse impacts associated with the project, or the project in combination with other projects on the receiving waters. Appropriate mitigation measures are in place to ensure that any potential adverse impacts are avoided through provision of appropriate infrastructure, management of the infrastructure and monitoring of the discharge from the treatment works. As no residual adverse effects are identified within the Natura Sites, consideration of alternatives is not required in this process.

5 Stage 4 Imperative Reasons of Overriding Public Interest

1. Are there imperative reasons of overriding public interest? **No**
2. Are there human health or safety considerations or important environmental benefits? **No**
WATER TRACING FROM MOYMORE QUARRY (RUAN)
COUNTY CLARE

Report to Clare County Council

David Drew
Moheraeroon, Kilfenora, Co. Clare

July 2012
Summary

Two tracing experiments were undertaken from the water flowing in Moymore quarry. An initial test using optical brightener indicated that the quarry water did not flow to the nearby spring flowing into Dromore Lough. A subsequent tracing using sodium fluorescein showed that the quarry water drains to Pouladower spring with an underground flow rate greater than 100m/h. These findings in conjunction with earlier work allow the Pouladower water budget and zone of contribution to be established with considerable confidence.
1. **Aim**

To determine where the underground stream intersected by the quarry at Moymore resurges and to relate the underground flow route to the known hydrogeology of the Dromore-Pouladower-Drumcliff area.

2. **The Setting**

Moymore quarry is located some 800m west of Dromore Lough in the lowland limestone through which the River Fergus flows. The limestones belong to the Burren Formation and dip gently (10-15°) to the west. Quarrying intersected a karstic flow channel with a discharge estimated at 50-70 litres/second apparently flowing from north to south (GR 33262 85205). The quarry is believed to be located within the catchment for Pouladower spring (Deakin 2000(a)) – based on the results of tracings from the sink on the southern side of Dromore Lough and from the sinking waters of the River Fergus in Lough Keagh to the north of Ruan. Deakin presumed that the Pouladower catchment was distinct and had no connection, with the contributing area for Drumcliff spring, a cherty rock unit forming a barrier to groundwater flow between the springs.
3. Methods

Two water tracings were undertaken. The first tracing was designed to check whether some or all of the Moymore quarry water flowed to the large Dromore South spring some 500m to the east. 10 litres of optical brightener tracer was used for this test as use of a coloured dye would have coloured the water flowing into Dromore Lough to an undesirable degree had the trace proved positive. Cotton pads were used to adsorb any optical brightener and in addition to Dromore Lough they were installed at Powder Hole, Ballygriffy spring and Poulgorm spring all located to the south of the quarry although it was considered unlikely that the amount of optical brightener would produce a positive result at any site other than Dromore South. Detectors were changed 48, 96 and 120 hours following tracer input and all sites were negative. It was concluded that no link exists between the quarry sinks and the Dromore Lough spring and therefore a second tracing using 5kg of sodium fluorescein, injected at the Moymore quarry sink, was undertaken. The amount of dye used was large in relation to the most likely discharge point at Pouladower spring. This was to ensure that sufficient tracer was present in the aquifer such that a negative result at a sampled spring could be taken, with confidence, to indicate that no connection between input site and a particular spring existed. This related especially to Drumcliff spring, which is a PWS source.

Water samples were taken from five springs (detailed below) at daily intervals for 8 days with a final sampling after 10 days, following tracer input at 1600h on 3rd July 2012.

120ml samples were taken in each case and kept in darkness prior to analysis. The initial analysis to detect the tracer was undertaken using a hand-held filter fluorometer. In order to verify and quantify the results, samples were re-analysed at the Geological Survey of Ireland using their dedicated Varian fluorescence spectrophotometer, which allowed for a higher degree of resolution of tracer concentrations.
The sampling sites were significant springs located to the south of the input as follows:

i. The Powder Hole – a karst window in the base of an elongated north-south depression in which a stream (flow estimated at 5-10 l/s) appears from the northern walls of the hollow, flows across the floor of the doline and sinks into the southern wall. It may represent overflow from a large conduit taking water from the Dromore Lough sinks to Pouladower spring or local, shallow epikarstic flow.

ii. Ballygriffy Spring – a spring from the east feeds into the Ballygriffy River from the east. Flow was estimated at 10-15 l/s. The origin of this water was completely unknown.

iii. Poulgorm Spring – a significant spring which drains into the River Fergus with a discharge of 10-20 l/s.

iv. Pouladower Spring – a large spring which flows into the northwestern corner of Ballyallia Lough and which has a variable discharge (see Table 1)

v. Drumcliff Spring – the PWS source for Ennis with an estimated mean flow of 250 l/s

A summary of the sampling sites in relation to the tracer input is given in Table 1

For the duration of the tracing water levels were close to or above average levels. Significant (rainfall sufficient to cause a measureable increase in the discharge of the River Fergus as monitored at Cross Bridge) occurred after tracer input. These rainfall events should have created recharge inputs to the aquifer allowing for thorough dispersion of the tracer but did not greatly affect flows from the springs.

Discharges at all of the springs (excepting Drumcliff) and at the input site at Moymore were estimated (via current metering) on 2 or 3 occasions in May, June and July. The values are given in Table 1. Conductivity values were also measured and mean values are given in Table 1.
Table 1. Summary of the tracer sampling sites. Distances, difference in altitude and gradients relate to the input location in Moymore quarry (GR 33262 85205, altitude 12.2m O.D)

<table>
<thead>
<tr>
<th>Spring</th>
<th>Grid Ref</th>
<th>Altitude m O.D.</th>
<th>Distance from tracer input (m)</th>
<th>Input to spring height difference (m)</th>
<th>Gradient: input to spring</th>
<th>Estimated Q (litres/sec)</th>
<th>Conductivity (micro-Siemens/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dromore South</td>
<td>33479</td>
<td>85543</td>
<td>13</td>
<td>-0.8</td>
<td>-0.0016</td>
<td>250 l/s</td>
<td>299</td>
</tr>
<tr>
<td>Powder Hole</td>
<td>33684</td>
<td>84320</td>
<td>10</td>
<td>2.2</td>
<td>0.0018</td>
<td>5-10 l/s</td>
<td>309</td>
</tr>
<tr>
<td>Ballygriffy Castle</td>
<td>32256</td>
<td>82917</td>
<td>7.9</td>
<td>4.3</td>
<td>0.0015</td>
<td>10-15 l/s</td>
<td>398</td>
</tr>
<tr>
<td>Poulgorm</td>
<td>33944</td>
<td>82960</td>
<td>8.3</td>
<td>3.9</td>
<td>0.0013</td>
<td>10-20 l/s</td>
<td>360</td>
</tr>
<tr>
<td>Pouladower</td>
<td>33018</td>
<td>82271</td>
<td>5.7</td>
<td>6.5</td>
<td>0.0017</td>
<td>120-720 l/s</td>
<td>339</td>
</tr>
<tr>
<td>Drumcliff</td>
<td>32942</td>
<td>79000</td>
<td>4.6</td>
<td>7.6</td>
<td>0.0013</td>
<td>250 l/s</td>
<td>446</td>
</tr>
</tbody>
</table>
5. Results

I. The concentrations (micrograms per litre) at each site and at each sampling are shown in Table 2.

II. Tracer was recovered only from Pouladower spring. The amount of dye tracer used and the sampling regime employed means that it is very unlikely that water from Moymore quarry goes to any site other than Pouladower, at least under the water levels prevailing during the test.

III. Pouladower spring is located some 3700m south of the quarry. Tracer reached the spring approximately 20 hours after input giving a flow rate of c. 175m/h. The main mass of tracer took approximately 35 hours to reach the spring, a flow rate of c.100m/h.

IV. Tracer continued to be discharged at the spring for some 150 hours after its initial arrival.
Table 2 Tracer concentrations in micrograms/litre at each of the sampling sites.

<table>
<thead>
<tr>
<th>SAMPLING RUN</th>
<th>HOURS AFTER TRACER INPUT</th>
<th>POWDER HOLE</th>
<th>BALLYGRIFFY SPRING</th>
<th>POULGORM SPRING</th>
<th>POULADOWER SPRING</th>
<th>DRUMCLIFF SPRING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1900</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>550</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>94</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>117</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>142</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>164</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>212</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Interpretation and Conclusions

I. All the water sinking in Moymore quarry flows to Pouladower and therefore the Drumcliff and Pouladower systems are not linked. This is supported by the fact that the conductivity of the Drumcliff spring differs from that at Pouladower, and indeed from conductivities recorded at any of the other sites (Table 1).

II. The underground flow rate is rapid, comparable with those recorded for the plateau karst of the Burren.

III. During the course of the tracing the water flows discharging from the Dromore Lough springs, Pouladower spring and the Moymore sink were measured. The Dromore springs had an outflow of c. 400 l/s (and this was presumably also the inflow into the Dromore Lough sinks which are known to feed to Pouladower). The quarry sink had a mean inflow of 60 l/s and Pouladower had an outflow of c.450 l/s. Thus the inflows roughly balance the Pouladower outflow. Thus the water budget for Pouladower is now in balance and the source of the great majority of its outflow is known. This resolves the problem remarked upon in the Pouladower source protection study, in which it is remarked:

“The total quantity of water sinking at Poulasheersha and Dromore Lough... was less than the discharge at Pouladower. Therefore... a significant proportion of flow discharging at Pouladower is coming from either a direct route channel from the Lough Keagh area, from smaller fissures in the surrounding rock, or via another, as yet untraced, route”. (Deakin 2000a).

IV. The origin of the Moymore quarry water is not known but the large and consistent flow of 50-75 l/s as measured during the tracings) suggests that the River Fergus is the only likely source for the water, possibly the sinkholes in Lough Keagh to the north. The two hollows, the more northerly with a flow of water from north to south, located some 500m north of the quarry may be on such a flow channel from the River Fergus to Moymore. If this is the case (proving the same by water tracing would only be possible under very low flow conditions in the River Fergus) would mean that almost all of the Pouladower water originates from a short reach of the River Fergus.
and flow to the spring via a series of sub-parallel distributary channels of which the Moymore route is one.

V. The source of the water discharging from the springs at Ballygriffy and Poulgorm remains unknown.
6. References


David Drew

19 July 2012
Ennis Public Supply

Pouladower Spring

Co. Clare

Groundwater Source Protection

(DRAFT)

February 2000

Prepared by:

Jenny Deakin
Geological Survey of Ireland

Assisted by:

Donal Daly, Geological Survey of Ireland
Catherine Coxon, Trinity College Dublin
David Drew, Trinity College Dublin
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SCHEDULE OF MAPS

Map A  Source Protection Areas
Map B  Groundwater Vulnerability
Map C  Source Protection Zones
Pouladower spring
(Draft)

1. Introduction

Pouladower spring is located approximately 3 km to the north of Ennis, rising at the north-western corner of Ballyallia Lough. Ennis Urban District Council have recently investigated the spring with a view to harnessing it to provide an additional source of drinking water for Ennis. The current source is Drumcliffe Spring which is approaching the safe abstraction capacity. Pouladower spring is not currently being used by the local authority but it is being considered as a backup supply to reduce the dependency on Drumcliffe Spring.

This report sets out the available hydrogeological information for Pouladower spring and puts forward a conceptual model for groundwater flow to the source. It then delineates a catchment area to the spring and addresses the issue of protecting the groundwater within it. The report is intended to draw together all the currently available information and to assemble it in a format which is consistent with the national source protection guidelines as set down in the joint document by the Department of the Environment and Local Government, the Environmental Protection Agency and the Geological Survey of Ireland (DELT/EPA/GSI, 1999).

2. Spring details

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSI no.</td>
<td>1117 NEW065</td>
</tr>
<tr>
<td>Grid ref.</td>
<td>13343 18150</td>
</tr>
<tr>
<td>Elevation</td>
<td>5.74 m OD (Malin Head)</td>
</tr>
<tr>
<td>Depth-to-rock</td>
<td>~1 m</td>
</tr>
<tr>
<td>Static water level</td>
<td>surface</td>
</tr>
<tr>
<td>Estimated discharge</td>
<td>10,000–62,400 m$^3$/d</td>
</tr>
</tbody>
</table>

The actual discharge point of the spring varies depending on regional water levels. Under dry conditions, water flows eastwards from the spring, via a channel, towards Ballyallia lake. The area is liable to flood during periods of heavy rain however, when the lake water comes back up the channel and submerges the spring.

3. Topography

There are four distinct topographical regions in the area of interest. In the vicinity of the Fergus River the land lies at an elevation of less than 31 m OD (100 ft) and comprises a relatively flat plain. To the west the land rises up to a height of 190 m OD (626 ft) in a north-south trending ridge. The northern region comprises the Burren Plateau which reaches a height of 274 m (900 ft), while to the east the land rises to a height of 400 m (1312 ft) on Maghera Mountain.
4. **Geology**

4.1. **Bedrock geology**

The bedrock geology spans approximately 130 million years from the Silurian sandstones and shales in the east, through the Devonian Old Red Sandstones (ORS), the Lower Carboniferous limestones and shales, to the Upper Carboniferous sandstones and shales in the west. In general, the different rock types are associated with the different physiographical regions: the Silurian and the ORS are found in the upland regions to the east, the Lower Carboniferous is found in the low-lying areas in the Fergus River valley, and the Upper Carboniferous rocks form the upland area to the west. The rock types are summarised in Table 1.

With the exception of the Silurian rocks which are steeply dipping, the rocks generally dip 10–15° to the west and have undergone various degrees of structural deformation depending on their age and their location. In general, the oldest rocks and those located towards the south of the county are more faulted and folded than the younger rocks and those located towards the north of the county, respectively. The Silurian rocks are relatively soft and have been extensively broken up. The major fault trends in the area (north-south and east-west directions) are evident in the Old Red Sandstones and the Lower Carboniferous limestones, while the Upper Carboniferous Namurian sandstones and shales have not undergone as much deformation. Most of the rocks are also well weathered in the upper few metres.

On a more local scale there is an area of deformation, known as The Fergus Shear Zone, which trends in a narrow band from the Fergus Estuary north-northeastwards through Ennis towards Gort, and is essentially an extensive fault zone. This fault zone has particularly influenced the fault and joint patterns in the area. More detail on the individual rock types can be found in the main Groundwater Protection Scheme report and on the geology map of the county (Map 1).

4.2. **Subsoils geology**

The subsoils in the area are directly influenced by the underlying bedrock. The deposits in the low-lying limestone areas comprise mainly silty, sandy silty and gravelly sandy tills (boulder clay) dominated by limestone pebbles. Drumlins (elongated small hills oriented in the direction of movement of the glaciers) are common and are made up of mainly silt rich tills (BSS930: sandy SILT). Where subsoils in these areas are relatively thin, they are less well developed coarser grained,

<table>
<thead>
<tr>
<th>Table 1. Bedrock lithologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Upper Carboniferous (Namurian)</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Visean limestones</td>
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<td></td>
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<tr>
<td>Waulsortian Limestones</td>
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<td></td>
</tr>
<tr>
<td>Ballysteen Limestones</td>
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<tr>
<td>Lower Limestone Shales</td>
</tr>
<tr>
<td>Old Red Sandstone</td>
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<tr>
<td></td>
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<tr>
<td>Silurian</td>
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</tbody>
</table>
sandy or gravelly deposits (BS5930: silty sandy GRAVEL). Towards the east of the limestone area, the underlying bedrock is more shaly and this has given rise to a higher percentage of clay in the deposits (sandy SILT/CLAY).

In the western area, overlying the Namurian rocks, the subsoils have a much higher proportion of clay present in the deposit matrix which is derived from the underlying shales and shaly mudstones (BS5930: sandy CLAY or CLAY). Drumlins of the clay rich material are common but between them, and where the deposits are thin, the subsoils are less well developed and are described as broken up rock. This gives rise to coarse grained clayey gravel deposits (BS5930: clayey GRAVEL).

In the upland areas to the east, overlying the Old Red Sandstones and Silurian sandstones, siltstones and mudstones, the subsoils are typically high in both sand and clay (BS5930: sandy CLAY or clayey SAND). Drumlins are present around the foot of the mountains where the deposits are thicker. In some areas, there are also looser, more sandy deposits present (BS5930: soft SAND or silty SAND).

Alluvial deposits, comprising a mixture of clays silts and sands, are present along the river valleys in the lower lying areas. There is thin peat in the low-lying areas in ancient lake basins and more extensive peat deposits overlying the low-permeability Namurian rocks. Further details can be found in the main Groundwater Protection Scheme report and on the subsoils map of the county (Map 2) (Deakin et al., 1999).

4.3.  Depth-to-rock
Depth-to-bedrock in the immediate vicinity of the spring is estimated from nearby trial wells and outcropping rock to be less than 1 m. A large proportion of the catchment has rock present close to the surface with a thin subsoil cover of usually less than 3 m. There are also extensive areas where the depth-to-bedrock is mapped as between 3 and 10 m. In general, subsoils do not reach more than 10 m in thickness throughout the area except where drumlins are present, where the thickness of the deposits then depends upon the height of the drumlin. In these instances the subsoils may reach a thickness of more than 30 m.

5.  Surface hydrology
Pouladower Spring is located within the River Fergus catchment area where the surface hydrology is complex and is closely interlinked with groundwater. Many of the surface water courses sink underground before rising to the surface further down-gradient and then sinking again. Depending on rainfall and water levels throughout the catchment, rivers may also vary from being losing rivers (i.e. where river water flows to groundwater through the river bed), to gaining rivers where the rivers are fed by groundwater.

A number of water tracing experiments have been carried out in the area by Dr. D. Drew and Dr. C. Coxon of TCD which prove underground connections between various parts of the river systems. There are also known links between many of the swallow holes and caves to surface water courses and springs. The proven traces and links are shown on the hydrogeology map of the county which is part of the Groundwater Protection Scheme report (Map 4).

There are four main river systems which are of significance to Pouladower Spring:
1. the River Fergus with its associated underground connections from the Burren area;
2. the Castlelodge River system including the northeast-southwest band of lakes at the foot of Mullaghmore (Lough Atedaun, Lough Cullaun, Ballyeighth Loughs, Muckanagh Lough and others);
3. the Moyree river system which joins the River Fergus to the north of Dromore Lough after a stretch of artificial river channel; and
4. the Inchicronan Lough system which joins the river Fergus to the south of the Moyree system, but also up-stream of Dromore Lough.

While some of the rivers rise in either the Silurian, Old Red Sandstone or Namurian rocks, the majority of each of them flows through the limestone area and they are all closely interconnected with groundwater.

Land drainage is poor over the Namurian rocks in the western upland part of the area and overlying the ORS and Silurian in the east. The low-lying limestone areas (less than 31 m OD) are generally well drained outside the river channels, although are subject to a certain degree of flooding during wetter periods. Water levels throughout the catchment area are highly responsive to rainfall.

6. Hydrogeology

6.1. Data availability

Hydrogeological data for the area around Pouladower were obtained from the following:

- a hydrogeological study carried out at Pouladower Spring for Ennis Urban District Council by KT Cullen and Co. (KT Cullen and Co., 1996);
- research carried out by C. Coxon and D. Drew in the area (e.g. Coxon, 1994; Coxon and Drew, 1998; Coxon and Drew, 1999; Drew, 1988; Drew, 1990);
- a report on groundwater and karstification in mid Galway, south Mayo and north Clare (Drew and Daly, 1993);
- a report by David Drew to OPW on Mullaghmore Interpretative Centre (Drew, 1991);
- a GSI report by Donal Daly on the flooding in the Gort-Ardrahan area (Daly, 1992);
- the report by Southern Global Water to the OPW on the flooding in the Gort area (Southern Water Global Ltd./Jennings O’Donovan and Partners, 1997);
- GSI files;
- Limited additional fieldwork.

6.2. Spring Discharge

Flow measurements carried out in September and October 1996 by KTC and Co., showed that the spring discharge varies from 13,000–62,400 m$^3$/d. The tests were conducted during fairly dry weather and the report concluded that 10,000–12,000 m$^3$/d was the likely low flow or sustainable yield. The high flow is more difficult to ascertain as the area is liable to flood but during the tests, the flow increased from 18,500 to 62,000 m$^3$/d in three days with the onset of a period of heavy rain. The maximum discharge of the spring is not known and may be higher than this recorded high flow. These variations are typical of a karst spring and there are other springs in the area which exhibit the same characteristics. Mean flows in the springs in the Burren are an order of magnitude greater than base flows, while peak discharges may be three orders of magnitude greater. Elmvale Spring for example discharges within the range ±10% of mean flow, only 10% of the time (Drew, 1990).

6.3. Catchment area delineation

Delineation of the catchment area for Pouladower Spring is complex. There is a high degree of interconnectivity between the surface water and groundwater catchments, within an extensive area of karstified limestones in which flow is unpredictable. The hydrogeology is not as well constrained by the geology and surface water hydrology as for the Drumcliff source.

There are three well known effective methods for delineating catchment areas of karst springs (USEPA, 1996);
• tracer testing;
• hydrogeological mapping; and
• discharge balancing.

The tracer testing and hydrogeological mapping methodologies are selected for Pouladower as being the most appropriate with the available data, particularly due to the uncertainty in the high flow discharge measurements.

It is reasonably well established from tracing tests that the Pouladower and Drumcliff catchment areas are separate and that overlap, if any, may be small. There has never been a trace proven across the boundary and water quality at Pouladower is better and more stable than at Drumcliff which would suggest a different source of water.

Direct links have been traced to the source, at medium to high water levels, from sinks present in Dromore Lough, and (indirectly) from Lough Keagh which is located at the beginning of the artificial channel between Lough Atedaun and Ballyteige Lough. The catchment area for the spring therefore must incorporate the catchment areas to Lough Keagh and Dromore Lough, and this essentially includes the entire Fergus River catchment north of Ballyalla Lough, including the Castlelodge River system and its associated lakes.

The Moyree and Inchicronan River systems flow into the River Fergus between Ballyteige Lough and Dromore Lough. The flow between Dromore Lough and the River Fergus, after these rivers have merged, is via a small channel in which the flow regularly reverses depending on different hydrological conditions and the height of the water in the lake. This does not appear to be a seasonal variation but rather can change on a daily basis (Enda Mooney, OPW; pers comm.). Therefore at times when the flow is from east to west, i.e. from the River Fergus into Dromore Lough, the entire Moyree River system and Inchicronan Lough systems also become part of the Pouladower catchment. When flow is in the other direction, they may not.

The Fergus River and Castlelodge River catchment areas have been defined in other studies by Coxon and Drew, and their boundaries are adopted here. The Moyree River and Inchicronan Lough system boundaries are delineated based mainly on topography (see below). The surface water catchment boundaries are considered to be good approximations of the groundwater catchment boundaries as, in most instances, they occur in areas underlain by relatively low permeability rocks and associated low permeability subsoils, e.g. Silurian, Old Red Sandstone and Namurian areas. In the limestone areas, the boundaries are delineated based on tracing work and groundwater flow directions. Each segment of the catchment boundary, with its inherent level of confidence, is described briefly as follows:

1. The western boundary of the catchment (i.e. that which overlies the Namurian bedrock) is fairly well constrained. The groundwater catchment divide coincides well with the River Fergus surface water catchment divide as the bedrock has a relatively low permeability and the water table closely reflects topography.
2. To the northwest, in the Burren area, the boundary is based on the results of a number of tracing tests which are taken from D. Drew’s work (Drew, 1988).
3. The northern boundary is dependent on the surface water catchment boundary of the River Fergus and groundwater flow characteristics (i.e. in the direction of the dip of the rocks; refer to Section 6.5). This boundary is also taken from D. Drew’s work (Drew, 1988).
4. To the northeast of the area, the boundaries are taken from hydrogeological investigations carried out at Mullaghmore by D. Drew (1991) and in the Gort area by Southern Water Global Ltd./ Jennings O’Donovan and Partners (1997), and they are essentially the surface water catchment boundaries of the Castlelodge River and lakes system.
5. The eastern boundary is based on topography and the surface water catchment areas of the Moyree River and Inchicronan Lough systems.
6. The southern part of the catchment is the boundary with the Drumcliff Spring catchment and is controlled by the presence of a relatively low permeability cherty bedrock unit which trends in a north-south direction between the two catchments. The north-south fracturing associated with the Fergus Shear Zone (refer to Section 4.1) is also likely to be channeling groundwater in a southerly direction, thereby ensuring flow does not cross the cherty bedrock unit.

7. The southeastern part of the boundary is based on the catchment area of the River Fergus and is somewhat arbitrary as there is little information regarding connections between the river and Pouladower. Further tracing in the future may enable the boundary to be refined in this area.

The area as described is much larger (c. 380 km²) than the area required to supply the source, perhaps more than 10 times larger at some water level conditions. However, it incorporates the intricately interlinked catchment areas for two major outlets of water from the system, Pouladower Spring and the River Fergus. It is difficult to isolate the actual area contributing to the spring as it will vary with different water level conditions. At high water levels, for example, smaller sub-catchments, which would normally be isolated from the main flow to Pouladower, may overflow into the main zone of contribution and contribute to the spring. Groundwater may also leave the system via other conduits connected to the main river channel. As it is possible that contaminants reaching groundwater or surface water anywhere within the catchment may influence water quality at Pouladower, the entire area must be considered in protecting the source.

6.4. Hydrochemistry and water quality

There are a number of sources of hydrochemistry and water quality data for Pouladower Spring which are summarised as follows:

- Groundwater Protection Scheme project sampling in Oct 1997 and March 1998. Two full analyses carried out by the State Laboratory as part of the project which include all major anions and cations, metals, hardness and alkalinity. Bacteriological analyses and ammonia were carried out concurrently by the County Council.
- EUDC annual drinking water returns 1992–1996 inclusive. Raw water samples which were taken fortnightly, including basic C1–C2 type parameters (colour, turbidity, odour, pH, conductivity, nitrate, nitrite, ammonium, iron and manganese).
- KT Cullen and Co. (1996) Investigations at Pouladower Spring for Ennis UDC. Samples were taken in September and October 1996 for slightly more comprehensive analyses including C2 type parameters, and calcium, magnesium, sodium, potassium, chloride, bicarbonate, total hardness and alkalinity.

The hydrochemical analyses suggest that Pouladower spring has a moderately hard water (151–250 mg/l (CaCO₃)), with alkalinitities of 140–185 mg/l (CaCO₃)) and conductivities of 314–462 μS/cm. These values are all lower than would normally be expected from a typical limestone water, suggesting that the groundwater residence time in the carbonate environment is relatively short.

Water quality at Pouladower is generally relatively good with low levels of chemical contaminant indicators such as chloride, nitrate and potassium. The bacteriological analyses however, often show the presence of faecal coliforms (E. coli), although this is typical in a karst spring where groundwater travel times are often much less than 100 days*. Colour is the main problem parameter with respect to the EU drinking water requirements and it often exceeds the MAC. Iron is not as much of a problem as it is at Drumcliff Spring and is seldom at a level which is cause for concern.

Elsewhere in the limestones in the catchment, similar problems with E. coli and colour are found, with additional problems of iron and turbidity (Coxon and Drew, 1998). Overall the water quality at Pouladower Spring is better and generally more stable than in the nearby Fergus River and at other large karst springs, including Drumcliff. As groundwater and surface water in the limestone areas are

* Bacteria and most viruses will not live longer than 100 days in groundwater.
so intricately linked through the Pouladower catchment, the surface water quality is likely to play a role in the water quality at the springs. Similarly, groundwater quality will have an influence on surface water quality in the limestone areas. Data from a recent EPA report (Lucey, et al., 1999) shows the lake quality to be generally good within the catchment although Dromore Lough was considered to be strongly polluted.

The water quality in the other rocks is also generally good. Further details can be found in a separate report on hydrochemistry and water quality which accompanies the main Groundwater Protection Scheme report (Cronin and Deakin, 1999).

6.5. Conceptual model

There are three main hydrogeological units in the Pouladower catchment:
(a) the Namurian rocks to the west of the catchment;
(b) the Waalsortian Limestones, Ballysteen Limestones, Lower Limestone Shales, ORS and Silurian rocks to the east; and
(c) the Visean limestones which are the main aquifer feeding the springs.

The Namurian rocks, Waalsortian Limestones, Ballysteen Limestones, Lower Limestone Shales, ORS and Silurian rocks have relatively low permeabilities with little or no solution occurring in the fractures, and are considered to be Poor (P) to Locally Important (L) aquifers. As a consequence, recharge is low; groundwater flow paths are often shallow and short; groundwater discharge occurs relatively quickly into nearby surface water channels; and stream density is high with ‘flashing’ flow.

The Visean limestone aquifer is a regionally important highly karstified aquifer (Rk), with localised high permeability zones which give rise to rapid groundwater velocities. Further details about the limestone aquifer characteristics can be found in the main Groundwater Protection Scheme report (Deakin, et al, 1999). In summary, groundwater is likely to flow in three main hydrogeological regimes:

(1) An upper, shallow, highly karstified weathered zone, known as the epikarst, in which groundwater moves rapidly through a dense network of solutionally enlarged conduits, in direct response to recharge.

(2) A deeper zone, where groundwater moves through interconnected solutionally enlarged conduits and cave systems which are mainly controlled by:
   (i) bedrock lithologies. The less permeable units, e.g. chert, dolomite and clay waybands (clay bands) inhibit vertical groundwater flow;
   (ii) the dip direction of the bedding planes. Groundwater flows down dip along the surfaces of the less permeable beds; and
   (iii) structural deformation. Groundwater flows preferentially in the north-south and east-west directions, parallel to the major fault trends. The faults are a particularly important factor for flow through the less permeable units.

(3) A more dispersed slow groundwater flow component in smaller fractures and joints outside, but usually linked to, the main conduit systems.

The epikarst is thought to be relatively modern, being formed after the last ice age, while the deeper karst is likely to be a remnant of not only recent solution, but also glacial and pre-glacial solution. All three groundwater flow regimes will be hydraulically connected in places with the degree of interconnection depending on the presence of less permeable bedrock units, and the faults and joints associated with the structural deformation.

Recharge in the catchment area is variable depending on the aquifer type. There is minimal recharge occurring in the Poor (P) to Locally Important (L) aquifers as a consequence of the relatively low permeabilities. The runoff, particularly in the Namurian rocks, is also acidic due to the shales and overlying peaty subsoils and it quickly dissolves the carbonate limestone rocks. This has resulted in a ring of swallow holes, sinks and large cave systems at the boundary between the clean Visean
Limestone and the Namurian rocks where karstification processes are still active today. Numerous examples of this occur around the Burren where runoff sinks underground into the limestones within a short distance of the boundary.

Recharge in the limestones is derived from diffuse rainfall on the bedrock surface and from sinking streams, swallow holes and losing rivers, i.e. point or line recharge. There is an effective hydraulic interconnection between groundwater and surface water in the karst limestone areas: much of the groundwater will spend at least some time on the surface and there are many places where surface water sinks underground.

There have been several tracer tests conducted in the Pouladower catchment which have shown that flow in the karstified limestones is rapid. Traces carried out at medium to high water levels for example, show that water from Dromore Lough can reach the spring in 2–3 days and can travel from Lough Keagh, via Poulasheersha, to the spring in less than 2 days. The total quantity of water sinking at Poulsheersha and Dromore Lough during the tests was less than the discharge at Pouladower. Therefore, at least at some water levels, a significant proportion of flow discharging at Pouladower is coming from either a direct route channel from the Lough Keagh area, from smaller fissures in the surrounding rock, or via another, as yet untraced, route.

Work carried out by Dr. Norman Allott of TCD has shown that at high water levels, water can travel through Lake Inchiquin in 10 days, although velocities through lakes can be much slower depending on the type of lake, the inflow and outflow channels, and the water level conditions (C. Coxon, pers. comm.). Potential contaminants can therefore make their way through the catchment to the source in a relatively short time.

It is probable that a high proportion of the flow to the springs is in direct-route, underground, solutionally enlarged conduits in the limestones, with a somewhat lesser contribution from the smaller, more diffuse network of fissures and conduits in the surrounding rock. The proportion of flow travelling through large conduits will vary with different water levels: there is likely to be more flow in the diffuse fissures at lower water levels.

The fluctuations in colour and bacteria, and occasionally iron, are typical of a karst environment with a rapid 'flashy' response to rainfall events and short residence times. The Namurian rocks to the west of the area, or the sandstones and overlying peat to the east, may be the origin of some of the suspended matter, although there may also be a contribution from ancient infilled unconsolidated deposits in karst depressions and/or the epikarst. Heavy rainfall can cause temporary high water levels in these shallow zones and pulses of recharge can displace material which is normally relatively undisturbed. Bacteria are a common problem in karst areas as groundwater travel times are so short, being often much less than the 100 days required for most bacteria and viruses to die off.

The northeast-southwest band of lakes in the Castlelodge River system are a particularly significant factor within the catchment area as they constitute a substantial body of water where significant dilution and sediment deposition is occurring. This, together with the input of groundwater from fissures, may account for the relatively stable, good quality groundwater which is discharging at the spring compared to Drumcliff.

Pouladower Spring is therefore considered as both a surface water and a groundwater source, derived largely from river waters sinking at Dromore and Lough Keagh. The river waters however, are derived largely from groundwater. As the surface water and groundwater systems are so well interconnected throughout the catchment, they need to be considered together in protecting the source.
7. Source Protection

7.1. Introduction
Pouladower is a combined surface water/groundwater source with a very large potential catchment area (c.380 km²), only part of which contributes to the source at any one time. An innovative approach to delineating protection zones is therefore required which maintains a pragmatic defensible methodology and provides adequate protection for the source. Discussions were held with the EPA and the local authority and the following approach, based on adapting the national Groundwater Protection Scheme (DELG/EPA/GSI, 1999), was agreed.

It is useful at the outset to clarify the aims and objectives of delineating protection zones for karst sources, which while they are similar, are not identical to those for granular and fissured aquifers.

7.2. Aims and objectives
1. To protect groundwater in the zone of contribution to the source from contamination. There are two types of contamination under consideration, chemical and microbiological. Different protection areas are required for each (known as the Outer and Inner Protection Areas, respectively) to ensure that the concentrations of potential contaminants are lowered to within EU drinking water standards before they reach the source.
2. To provide time to react to unexpected contamination incidents within the above areas.

There are a number of points to consider in trying to achieve these objectives for a source located in a highly karstified regime, such as Pouladower Spring.

- The spring discharges from a well developed karstic aquifer with high groundwater velocities, low storage, rapid response to recharge and little protective subsoil cover. Therefore potential contaminants can gain easy access to the aquifer and be rapidly transported to the source from anywhere over a large area.
- Groundwater flow is concentrated along discrete solutionally enlarged channels which are difficult to identify.
- There is a high degree of hydraulic connection between surface water and groundwater which is variable with different water levels, and the protection zones must therefore incorporate both components of the flow regime.
- The zone of contribution to a source in a highly karstified aquifer may vary with different water levels and flow conditions. The area to be protected must include all potential sub-catchments, although in different flow conditions not all of the area will contribute to the source.
- Water within the catchment area does not discharge at the spring alone. The delineated area includes the catchment area for the Fergus River, although a large proportion of it bypasses the Pouladower Spring via Ballyalla Lake. A somewhat smaller proportion may also escape by other discrete channels which will also be variable in different flow conditions. As the catchment areas to each outlet, and the surface water and groundwater components of the system, are inextricably linked, the entire area must be considered in protecting the source.
- In the national Groundwater Protection Scheme (DELG/EPA/GSI, 1998), the zone delineated for bacteriological protection of the source is based on a 100 day time of travel zone (Inner Protection Area; SI) such that bacteria will have died off before reaching the source. The high groundwater velocities in karst areas usually ensure that the entire karstified area within the zone of contribution is included in the Inner Protection Area.
- The main bacteriological hazards in the catchment area of Pouladower Spring are septic tanks and farmyards which cause a relatively low level of bacteriological contamination.
- Dilution is one of the major factors in lowering contaminant concentrations (particularly low level bacteriological contamination) in the rapid conduit flow component of the karst hydrogeological regime. The catchment area is large (up to 380 km²), the quantities of groundwater flowing
through the system are high, and the lakes provide additional dilution and sedimentation capacity. This factor is considered to be more significant in a karst regime than it would be in granular or fissure flow aquifers.

- Bacteriological contamination in karst aquifers is inevitable due to the rapid groundwater velocities which do not allow the bacteria and viruses time to die off. Treatment is almost always needed at karst public supplies to maintain good quality drinking water.

7.3. Inner Protection Area

The Inner Protection Area is delineated to protect against bacteriological contamination and is normally defined by the area within which groundwater takes 100 days or less to reach the source. At Pouladower, depending on the water level conditions, groundwater from anywhere within the limestone areas may reach the source within 100 days. If the standard Inner Protection Area were delineated it would result in an extremely large area which is impractical and unnecessary for the management of potentially contaminating activities for the following reasons:

1. There is significant dilution occurring throughout the Pouladower system within the large catchment area, particularly in the lakes, which is not usually the case at other sources;
2. At sources in other aquifer types the Inner Protection Area is delineated to prevent bacteriological contamination occurring. Bacteriological contamination of karst sources is inevitable due to the rapid groundwater velocities and the high interconnectivity with surface water. Disinfection of the supply is essential.

It is considered to be more appropriate, in this instance, to delineate the area of highest risk to the source as the Inner Protection Area, to assist the local authority in prioritising resources, e.g. monitoring, hazard mapping etc. While groundwater within this area can reach the source in much less than 100 days, perhaps within 2 or 3 days, it is considered to be the area of highest risk to the source and, in the event of an accidental spill, it should provide adequate warning to increase treatment where possible or otherwise temporarily cease abstraction.

The Inner Protection Area, in this instance, therefore includes the southernmost part of the catchment closest to the source, from Pouladower Spring as far up-gradient as the band of lakes where most of the dilution is taking place. The area is bounded by the surface water catchments to the natural and artificial river channels between Lough Atedaun and the junction with the Moyree river system; the River Fergus from there as far south as Ballyalla Lake; and the boundary with the Drumcliffe Spring catchment boundary. The Moyree and Inchicronan catchments are not considered to be part of the highest risk area as they only contribute to the source at certain water levels. It is also likely that groundwater from the other side of the River Fergus (from Lough Keagh onwards) will flow towards the Fergus and out of the system via the river channel.

Groundwater travels quickly through this high risk area, the medium to high flow traces suggesting velocities of 90–250 m/h, allowing advance warning of approximately 1.5–3 days, depending on proximity to the source. The area is classed as the Inner Protection Area so that it will be given the highest level of protection available.

7.4. Outer Protection Area

Outside the highest risk area, while groundwater in the limestones may still reach the source within 100 days, there is considerable dilution of potential contaminants occurring due to the number of lakes in the system and the high groundwater throughput in the karst aquifer. There may also be significant delay in travel times, at certain water levels, as water moves through the lakes. It is considered that these areas pose a significantly lesser threat to the groundwater quality at the source than the Inner Protection Area and therefore the remainder of the catchment is classed as the Outer Protection Area. The protection areas are shown on Map A.
8. Vulnerability

Vulnerability depends on the thickness, type and permeability of the subsoils. A detailed description of the vulnerability categories can be found in the main Groundwater Protection Scheme Report (Deakin, 1999) or in the Protection Scheme document (DELG/EPA/GSI, 1999).

In the Pouladower catchment, there are large areas of rock outcrop and subsoil thicknesses are often <3 m. This gives rise to a vulnerability category of ‘Extreme’ over much of the area. Within this area, shallow rock (i.e. where the soil and subsoil is usually <1 m), is specifically delineated. It was felt that this would be helpful to the local authority in controlling potentially contaminating activities in these areas as, for example, if landspreading of farmyard wastes from existing developments must be carried out, it is preferable that it should be directed towards areas where there is more than 1 m of soil and subsoil, rather than on bare rock.

As all surface water is connected to groundwater prior to reaching Pouladower spring, an area of ‘Extreme’ vulnerability is delineated along all surface water channels throughout the catchment as a means of indicating the threat to the source from surface runoff of contaminants into streams. This area also comprises 30 m and 10 m buffer zones along the normal channels in the Inner (SI) and outer (SO) areas, respectively, to highlight the risks from development in these areas. There are a number of karst features in the catchment area such as caves, swallow holes, turloughs and collapses which are all designated as points of ‘Extreme’ vulnerability on the vulnerability map as they provide easy access to groundwater for potential pollutants.

Outside the ‘Extreme’ areas, the subsoils comprise three main types: glacial till, alluvium, and peat. The tills overlying the relatively clean Visean limestone bedrock are considered to have a moderate permeability based on the grain size distribution of the deposits, the behavioural characteristics assessed using the British Standard BS5930, and the drainage and recharge characteristics of the area. The loose, sandy, sandstone derived tills in the northeast of the catchment are also classed as moderate permeability. The alluvial deposits are interpreted to have a moderate permeability as they will comprise a relatively high proportion of fine grained material being adjacent to the Namurian fine grained rocks and located in small flood plains. Therefore, depending on the depth to rock, the vulnerability of these moderately permeable deposits will range from ‘High’ (3–10 m thick) to ‘Moderate’ (>10 m thick).

Tills in the Namurian sandstone and shale area to the west of the catchment, and overlying the shaly limestones, the Old Red Sandstone and the Silurian rocks in the east have a higher percentage of clay in the matrix and have a lower permeability than those in the clean limestone area. Peat is also generally a low permeability material. The vulnerability of these deposits therefore ranges from ‘High’ (3–5 m thick), through ‘Moderate’ (5–10 m thick), to Low (>10 m thick) depending on the depth to rock. The ‘Moderately’ vulnerable areas in the low permeability materials are not shown on the vulnerability map (Map B) as they occur only in steep-sided drumlins where the depth to rock changes rapidly from 5 m to 10 m; it is not practical for mapping purposes to delineate the area. The peat deposits are usually relatively thin and the thickness rather than the permeability dictates the vulnerability classification. In thicker subsoils areas, they are considered in light of the permeabilities of the surrounding deposits.

Site investigation work at particular sites of potential development should always be carried out to assess both the permeability of the subsoils and the depth to rock.
9. **Groundwater Protection Zones**

Combining the source protection areas with the vulnerability categories (see the matrix in the table below) gives the groundwater protection zones around Pouladower Spring which are shown on the groundwater source protection zone map (Map C).

<table>
<thead>
<tr>
<th>VULNERABILITY RATING</th>
<th>SOURCE PROTECTION</th>
<th>Inner (SI)</th>
<th>Outer (SO)</th>
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<tr>
<td>Extreme (E)</td>
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<td>SO/E</td>
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<tr>
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<td>Low (L)</td>
<td>SI/L</td>
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</tbody>
</table>

The SO/M zone in low permeability subsoils (i.e. 5–10 m thick) is not shown on the map due to the complexity in the depth to rock and the scale of the maps. The appropriate Response Matrix (Code of Practice) for various potentially contaminating activities should be consulted to obtain the degree of restriction necessary in each protection zone. Response Matrices for landspreading of organic wastes and landfills have been developed by the DELG, EPA and GSI to date, and there will be others to follow.

10. **Land use and potential pollution sources**

There are numerous small farms located within the catchment area and much of it has been developed with scattered rural domestic housing and tourist accommodation. There are also a number of petrol stations. The surface water quality may also play a role in the quality of groundwater discharging at the source although it is not likely to be as significant as it is for Drumcliff.

11. **Conclusions and recommendations**

Pouladower spring is a large karst spring which is considered as a combined surface water and groundwater source. It responds rapidly to recharge, is extremely vulnerable to contamination, yet is generally of good water quality. This good quality may be a consequence of the lack of potential hazards, and/or adequate dilution and sedimentation of potential contaminants occurring in the northeast-southwest trending band of lakes at the foot of Mullaghmore, and/or the significant groundwater contribution to the source from smaller fissures outside the main conduits of flow.

The catchment area for the spring is unusually large as it also incorporates the catchment area for the Fergus River water bypassing the source via Ballyallia Lake. As the catchment areas to both are closely interlinked, and the proportion bypassing Pouladower varies with different water level conditions, the entire area must be considered in protecting the source.

An innovative approach to protecting the source is therefore required which is pragmatic, defensible and yet provides reasonable protection for the source. Following consultation with the EPA and the local authority, the National Groundwater Protection methodology has been adapted to take account of the local hydrological and hydrogeological characteristics. The Inner Protection Area, which is delineated to protect the source from bacteriological contamination, comprises the area of highest risk to the source between Pouladower Spring and the lakes. It does not, in this instance, include the 100 day travel time zone which would have included the entire limestone area: this is considered to be impractical and unnecessary for the management of potentially contaminating activities for the following reasons:
1. There is significant dilution occurring throughout the Pouladower system within the large catchment area, particularly in the lakes, which is not usually the case at other sources;
2. At sources in other aquifer types the Inner Protection Area is delineated to prevent bacteriological contamination occurring. Bacteriological contamination of karst sources is inevitable due to the rapid groundwater velocities and the high interconnectivity with surface water. Disinfection of the supply is essential.
The Outer Protection Area, designed to protect from chemical contamination, encompasses the remainder of the catchment area. These protection areas are combined with the vulnerability to give the groundwater source protection zones.

If it is intended to harness Pouladower for use as a public drinking water supply to augment the Drumcliff Source, as mentioned in the KT Cullen report of 1996, it is strongly recommended that the immediate area around the source be purchased and fenced off to reduce the likelihood of surface contaminants getting into the springhead.

12. References


Full Report for Waterbody Ennis

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

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Date Reported to Europe: July 2010
Date Report Created 27/03/2013
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Water Management Unit:</strong> &amp; N/A</td>
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<tr>
<td><strong>WaterBody Category:</strong> &amp; Groundwater Waterbody</td>
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<tr>
<td><strong>WaterBody Name:</strong> &amp; Ennis</td>
</tr>
<tr>
<td><strong>WaterBody Code:</strong> &amp; IE_SH_G_080</td>
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<tr>
<td><strong>Overall Status:</strong> &amp; Poor</td>
</tr>
<tr>
<td><strong>Overall Objective:</strong> &amp; Restore_2021</td>
</tr>
<tr>
<td><strong>Overall Risk:</strong> &amp; 1a At Risk</td>
</tr>
<tr>
<td><strong>Heavily Modified:</strong> &amp; No</td>
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</table>

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

Date Reported to Europe: July 2010
Date Report Created 27/03/2013
### Chemical and Quantitative Status Report

<table>
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<td>Ennis</td>
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<td>IE_SH_G_080</td>
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<table>
<thead>
<tr>
<th>Status Element Description</th>
<th>Result</th>
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<tbody>
<tr>
<td>INS Status associated with saline intrusion into groundwater</td>
<td>GS-HC</td>
</tr>
<tr>
<td>DWS Status associated with exceedances of water quality above specific standards</td>
<td>GS-LC</td>
</tr>
<tr>
<td>DS Chemical status of groundwater due to pressure from diffuse sources of pollution</td>
<td>GS-HC</td>
</tr>
<tr>
<td>CLS Chemical status of groundwater due to pressure from contaminated soil or land.</td>
<td>GS-HC</td>
</tr>
<tr>
<td>MS Chemical status of groundwater due to pressure from mine sites (active or closed).</td>
<td>GS-HC</td>
</tr>
<tr>
<td>UAS Chemical status of groundwater due to pressures from urban areas</td>
<td>GS-HC</td>
</tr>
<tr>
<td>GWS General groundwater quality status</td>
<td>GS-HC</td>
</tr>
<tr>
<td>RPS Status associated with MRP loading to rivers</td>
<td>Poor Stat</td>
</tr>
<tr>
<td>TNS Status associated with nitrate loading to transitional and coastal waters</td>
<td>GS-HC</td>
</tr>
<tr>
<td>SWS Overall status associated with nutrient loadings to rivers and transitional and coastal waters</td>
<td>Poor Stat</td>
</tr>
<tr>
<td>SQS Status associated with dependant surface water quantitative status</td>
<td>GS-HC</td>
</tr>
<tr>
<td>GDS Groundwater dependant terrestrial ecosystems status</td>
<td>GS-HC</td>
</tr>
<tr>
<td>QSO Quantitative status overall</td>
<td>GS-HC</td>
</tr>
<tr>
<td>CSO Chemical status overall</td>
<td>Poor</td>
</tr>
<tr>
<td>OS Overall status</td>
<td>Poor</td>
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</tbody>
</table>

GS-HC: Good status High Confidence  
GS-LC: Good status Low Confidence  
n/a - not assessed

**Status**  
By ‘Status’ we mean the condition of the water in the waterbody. It is defined by its chemical status and quantitative status, whichever is worse. Groundwaters are ranked in one of 2 status classes: Good or Poor.

You can read more about status and how it is measured in our RBMP Document Library at [www.wfdireland.ie](http://www.wfdireland.ie) (Directory 15 Status).

---

Date Reported to Europe: July 2010  
Date Report Created 27/03/2013
## Risk Report

**Water Management Unit:** N/A  
**WaterBody Category:** Groundwater Waterbody  
**WaterBody Name:** Ennis  
**WaterBody Code:** IE_SH_G_080  
**Overall Risk Result:** 1a At Risk  
**Heavily Modified:** No

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<tr>
<td>TE GWDTE Risk</td>
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<tr>
<td>Groundwater Quality</td>
<td></td>
</tr>
<tr>
<td>DIF Diffuse Elements (General) Risk</td>
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</tr>
<tr>
<td>DW Drinking Waters Risk</td>
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</tr>
<tr>
<td>INT Intrusions Risk</td>
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<tr>
<td>WB Water Balance Risk</td>
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<td>Groundwater Quality (General)</td>
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<td>GQ General Groundwater Quality Risk</td>
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<tr>
<td>Groundwater Quality (Point Risk)</td>
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<tr>
<td>CL Contaminated Land Risk</td>
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<tr>
<td>LF Landfill Risk</td>
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<tr>
<td>MI Mine Risk</td>
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</tr>
<tr>
<td>QY Quarry Risk</td>
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<tr>
<td>UR Urban Risk</td>
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<td>UW UWWT Risk</td>
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<tr>
<td>GW Diffuse Risk Sources</td>
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<td>WB3 Mobile Nutrients (NO3)</td>
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<tr>
<td>WB4 Mobile Chemicals</td>
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<td>WB5 Clustered OSWTSs and leaking urban sewerage systems</td>
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<td>GW Hydrology</td>
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<td>WB1 Water balance - Abstraction</td>
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<td>WB2 Abstraction - Intrusion</td>
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Date Reported to Europe: July 2010  
Date Report Created 27/03/2013
GW Point Risk Sources

<table>
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<tr>
<th>Risk Source</th>
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<tbody>
<tr>
<td>WB10</td>
<td>Risk from Point sources of pollution - Contaminated Land</td>
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<tr>
<td>WB11</td>
<td>Risk from Point sources of pollution - Trade Effluent Discharges</td>
</tr>
<tr>
<td>WB12</td>
<td>Risk from Point sources of pollution - Urban Wastewater Discharges</td>
</tr>
<tr>
<td>WB6</td>
<td>Risk from Point sources of pollution - Mines</td>
</tr>
<tr>
<td>WB7</td>
<td>Risk from Point sources of pollution - Quarries</td>
</tr>
<tr>
<td>WB8</td>
<td>Risk from Point sources of pollution - Landfills</td>
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<tr>
<td>WB9</td>
<td>Risk from Point sources of pollution - Oil Industry Infrastructure</td>
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Overall Risk

<table>
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<th>Risk Type</th>
<th>Classification</th>
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<tbody>
<tr>
<td>RA</td>
<td>Groundwater Overall - Worst Case</td>
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Risk Information

<table>
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<tr>
<th>Risk Type</th>
<th>Classification</th>
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<tbody>
<tr>
<td>CLR</td>
<td>Contaminated land risk</td>
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<tr>
<td>DR</td>
<td>Risk of groundwater due to pressure from diffuse sources of pollution</td>
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<tr>
<td>DWR</td>
<td>Risk associated with exceedances of water quality above specific standards</td>
</tr>
<tr>
<td>GDR</td>
<td>Groundwater dependant terrestrial ecosystems risk</td>
</tr>
<tr>
<td>GWR</td>
<td>General groundwater quality risk</td>
</tr>
<tr>
<td>INR</td>
<td>Risk associated with saline intrusion into groundwater</td>
</tr>
<tr>
<td>LR</td>
<td>Risk due to landfills sites/old closed dump sites</td>
</tr>
<tr>
<td>MR</td>
<td>Mines risk</td>
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<tr>
<td>NULL</td>
<td>Diffuse nitrates from agriculture risk</td>
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<tr>
<td>QR</td>
<td>Risk due to quarries</td>
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<tr>
<td>RA</td>
<td>Revised risk assessment</td>
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<tr>
<td>RPR</td>
<td>Risk associated with MRP loading to rivers</td>
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<tr>
<td>SQR</td>
<td>Risk associated with dependant surface water quantitative status</td>
</tr>
<tr>
<td>SWR</td>
<td>Overall risk associated with nutrient loadings to rivers and transitional and coastal waters</td>
</tr>
<tr>
<td>TNR</td>
<td>Risk associated with nitrate loading to transitional and coastal waters</td>
</tr>
<tr>
<td>UAR</td>
<td>Risk of groundwater due to pressures from urban areas</td>
</tr>
<tr>
<td>UWR</td>
<td>Risk due to direct discharges of urban wastewater</td>
</tr>
</tbody>
</table>

Risk

By ‘risk’ we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that ‘2008’ after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our 'WFD Risk Assessment Update' document in the RBMP document library, and other documents at www.wfdireland.ie (Directory 31 Risk Assessments).
Objectives Report

Water Management Unit: N/A
WaterBody Category: Groundwater Waterbody
WaterBody Name: Ennis
WaterBody Code: IE_SH_G_080
Overall Objective: Restore_2021
Heavily Modified: No

Objectives Description
Extended timescale information

<table>
<thead>
<tr>
<th>Objectives Description</th>
<th>Result</th>
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<tbody>
<tr>
<td>E1 Extended deadlines due to agricultural P</td>
<td>2021</td>
</tr>
<tr>
<td>E2 Extended deadlines due to agricultural N</td>
<td>No Status</td>
</tr>
<tr>
<td>E3 Extended deadlines due to mines</td>
<td>No Status</td>
</tr>
<tr>
<td>E4 Extended deadlines due to urban areas</td>
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</tr>
<tr>
<td>E5 Extended deadlines due to contaminated lands</td>
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</tr>
<tr>
<td>E0 Extended deadlines - overall</td>
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</table>

Objectives information

<table>
<thead>
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<th>Objectives</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td>OB1 Prevent deterioration objective</td>
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<tr>
<td>OB2 Restore at least good status objectives</td>
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</tr>
<tr>
<td>OB3 Reduce chemical pollution objective</td>
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<tr>
<td>OB4 Protected areas objective</td>
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<tr>
<td>OB0 Overall objectives - objective</td>
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</table>

Extended timescales

Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives

In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

Date Reported to Europe: July 2010
Date Report Created 27/03/2013
Measures Report

Water Management Unit: N/A

WaterBody Category: Groundwater Waterbody

WaterBody Name: Ennis

WaterBody Code: IE_SH_G_080

Heavily Modified: No

<table>
<thead>
<tr>
<th>Measures Description</th>
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<tr>
<td>BC Total number of basic measures which apply to this waterbody</td>
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</tr>
<tr>
<td>BW Directive - Bathing Waters Directive</td>
<td>No</td>
</tr>
<tr>
<td>BIR Directive - Birds Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>HAB Directive - Habitats Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>DW Directive - Drinking Waters Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>MAE Directive - Major Accidents and Emergencies Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>EIA Directive - Environmental Impact Assessment Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>SS Directive - Sewage Sludge Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>UWT Directive - Urban Waste Water Treatment Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>PPP Directive - Plant Protection Products Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>NIT Directive - Nitrates Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>IPC Directive - Integrated Pollution Prevention Control Directive</td>
<td>Yes</td>
</tr>
<tr>
<td>CR Other Stipulated Measure - Cost recovery for water use</td>
<td>Yes</td>
</tr>
<tr>
<td>SUS Other Stipulated Measure - Promotion of efficient and sustainable water use</td>
<td>Yes</td>
</tr>
<tr>
<td>DWS Other Stipulated Measure - Protection of drinking water sources</td>
<td>Yes</td>
</tr>
<tr>
<td>ABS Other Stipulated Measure - Control of abstraction and impoundment</td>
<td>Yes</td>
</tr>
<tr>
<td>POI Other Stipulated Measure - Control of point source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>DIF Other Stipulated Measure - Control of diffuse source discharges</td>
<td>Yes</td>
</tr>
<tr>
<td>GW Other Stipulated Measure - Authorisation of discharges to groundwaters</td>
<td>Yes</td>
</tr>
<tr>
<td>PS Other Stipulated Measure - Control of priority substances</td>
<td>Yes</td>
</tr>
<tr>
<td>MOD Other Stipulated Measure - Controls on physical modifications to surface waters</td>
<td>Yes</td>
</tr>
<tr>
<td>OA Other Stipulated Measure - Controls on other activities impacting on water status</td>
<td>Yes</td>
</tr>
<tr>
<td>AP Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents</td>
<td>Yes</td>
</tr>
<tr>
<td>OTS On-site waste water treatment systems</td>
<td>Yes</td>
</tr>
<tr>
<td>FPM Freshwater Pearl Mussel sub-basin plan</td>
<td>No</td>
</tr>
<tr>
<td>SHE Shellfish Pollution Reduction Plan</td>
<td>Yes</td>
</tr>
<tr>
<td>IPR IPPC licences requiring review</td>
<td>Yes</td>
</tr>
<tr>
<td>WPR Water Pollution Act licences requiring review</td>
<td>No</td>
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<tr>
<td>FOR Forestry guidelines and regulations</td>
<td>Yes</td>
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Date Reported to Europe: July 2010

Date Report Created 27/03/2013
Measures
Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in ‘River Basin Planning Guidance’ and in other documents in our RBMP Document Library at www.wfdireland.ie.
Full Report for Waterbody Ballycullinan, Trib of Fergus

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Date Reported to Europe: July 2010
Date Report Created 27/03/2013
### Summary Information:

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<td>River Waterbody</td>
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<tr>
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<td>Ballycullinan, Trib of Fergus</td>
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<tr>
<td>WaterBody Code:</td>
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<td>Overall Objective:</td>
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The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.
### Status Report

**Water Management Unit:** IE_SH_Fergus  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Ballycullinan, Trib of Fergus  
**WaterBody Code:** IE_SH_27_1083  
**Overall Status Result:** Poor  
**Heavily Modified:** No

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<td>PC General physico-chemical status</td>
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<td>FPQ Freshwater Pearl Mussel / Macroinvertebrate status</td>
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</tr>
<tr>
<td>DIA Diatoms status</td>
<td>N/A</td>
</tr>
<tr>
<td>HYM Hydromorphology status</td>
<td>N/A</td>
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<tr>
<td>FIS Fish status</td>
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<tr>
<td>SP Specific Pollutants status (SP)</td>
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<td>ES Overall ecological status</td>
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<td>CS Overall chemical status (PAS)</td>
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<td>DON Donor water bodies</td>
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n/a - not assessed

**Status**

By ‘Status’ we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).

---

**Date Reported to Europe:** July 2010  
**Date Report Created:** 27/03/2013
### Risk Report

**Water Management Unit:** IE_SH_Fergus  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Ballycullinan, Trib of Fergus  
**WaterBody Code:** IE_SH_27_1083  
**Overall Risk Result:** 1b - Probably At Risk  
**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Risk Test Description</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diffuse Risk Sources</strong></td>
<td></td>
</tr>
<tr>
<td>RD1 EPA diffuse model (2008)</td>
<td>1b - Probably At Risk</td>
</tr>
<tr>
<td>RD2a Road Wash - Soluble Copper</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD2b Road Wash - Total Zinc</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD2c Road Wash - Total Hydrocarbons</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD3 Railways</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD4a Forestry - Acidification (2008)</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD4b Forestry - Suspended Solids (2008)</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD4c Forestry - Eutrophication (2008)</td>
<td>2a - Probably Not At Risk</td>
</tr>
<tr>
<td>RD5 Overall Unsewered (2008)</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD5a Unsewered Areas - Pathogens (2008)</td>
<td>2a - Probably Not At Risk</td>
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<tr>
<td>RD5b Unsewered Phosphorus (2008)</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD6a Arable</td>
<td>2b - Not At Risk</td>
</tr>
<tr>
<td>RD6b Sheep Dip</td>
<td>2b - Not At Risk</td>
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<tr>
<td>RD6c Forestry - Dangerous Substances</td>
<td>2a - Probably Not At Risk</td>
</tr>
<tr>
<td>RDO Diffuse Overall - Worst Case (2008)</td>
<td>1b - Probably At Risk</td>
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<tr>
<td><strong>Hydrology</strong></td>
<td></td>
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<tr>
<td>RHY1 Water balance - Abstraction</td>
<td>2a - Probably Not At Risk</td>
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<td><strong>Morphological Risk Sources</strong></td>
<td></td>
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<tr>
<td>RM1 Channelisation (2008)</td>
<td>2b - Not At Risk</td>
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<tr>
<td>RM2 Embankments (2008)</td>
<td>2b - Not At Risk</td>
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<tr>
<td>RM3 Impoundments</td>
<td>2b - Not At Risk</td>
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<tr>
<td>RM4 Water Regulation</td>
<td>2b - Not At Risk</td>
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<tr>
<td>RM5 Intensive Landuse</td>
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<tr>
<td>RMO Morphology Overall - Worst Case (2008)</td>
<td>2b - Not At Risk</td>
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<tr>
<td><strong>Overall Risk</strong></td>
<td></td>
</tr>
<tr>
<td>RA Rivers Overall - Worst Case (2008)</td>
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</tr>
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</table>

Date Reported to Europe: July 2010  
Date Report Created 27/03/2013
### Point Risk Sources

<table>
<thead>
<tr>
<th>RP</th>
<th>Source</th>
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<tbody>
<tr>
<td>RP1</td>
<td>WWTPs (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP2</td>
<td>CSOs</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP3</td>
<td>IPPCs (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP4</td>
<td>Section 4s (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
<tr>
<td>RP5</td>
<td>WTPs/Mines/Quarries/Landfills</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>RPO</td>
<td>Overall Risk from Point Sources - Worst Case (2008)</td>
<td>2b</td>
<td>Not At Risk</td>
</tr>
</tbody>
</table>

### Q Value

- **Q**: EPA Q rating and Margaritifera Assessment
  - **Q/RDI or Point/Diffuse**
  - **QPD**: Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)
  - **1b**: Probably At Risk

### Rivers Direct Impacts

- **RDI 1**: Rivers Direct Impacts - Dangerous Substances
  - **N/A**

### Risk

By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our 'WFD Risk Assessment Update' document in the RBMP document library, and other documents at www.wfdireland.ie (Directory 31 Risk Assessments).

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Date Reported to Europe: July 2010
Date Report Created 27/03/2013
**Objectives Report**

**Water Management Unit:** IE_SH_Fergus

**WaterBody Category:** River Waterbody

**WaterBody Name:** Ballycullinan, Trib of Fergus

**WaterBody Code:** IE_SH_27_1083

**Overall Objective:** Restore_2021

**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Objectives Description</th>
<th>Result</th>
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<tbody>
<tr>
<td><strong>Extended timescale information</strong></td>
<td></td>
</tr>
<tr>
<td>E1 Extended timescales due to time requirements to upgrade WWTP discharges</td>
<td>No Status</td>
</tr>
<tr>
<td>E2 Extended timescales due to delayed recovery of chemical pollution and chemical status failures</td>
<td>No Status</td>
</tr>
<tr>
<td>E3 Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
<td>2021</td>
</tr>
<tr>
<td>E4 Extended timescales due to delayed recovery from physical modifications and physical damage</td>
<td>No Status</td>
</tr>
<tr>
<td>E5 Extended timescales due to delayed recovery following implementing forestry acidification measures</td>
<td>No Status</td>
</tr>
<tr>
<td>E6 Extended timescales due to physical recovery timescales at mines and contaminated sites</td>
<td>No Status</td>
</tr>
<tr>
<td>E7 Extended timescales due to delayed recovery of highly impacted sites</td>
<td>No Status</td>
</tr>
<tr>
<td>E8 Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
<td>No Status</td>
</tr>
<tr>
<td>E9 Extended timescales due to delayed recovery from nitrogen losses to estuaries</td>
<td>No Status</td>
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<tr>
<td>E10 Extended timescales due to delayed recovery following reduction in agricultural nutrient losses</td>
<td>No Status</td>
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<tr>
<td>E11 Extended timescales due to delayed recovery from physical modifications and physical damage (overgrazing)</td>
<td>No Status</td>
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<tr>
<td>E12 Extended timescales due to delayed recovery from physical modifications and physical damage (channelisation)</td>
<td>No Status</td>
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<tr>
<td>E13 Extended timescales from Northern Ireland Environment Agency</td>
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<tr>
<td>EOV Overall extended timescale - combination of all extended timescales fields</td>
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<td>E14 Extended timescales due to the presence of Freshwater Pearl Mussel populations</td>
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<td>EX15 Extended timescales due to highly impacted sites</td>
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Date Reported to Europe: July 2010

Date Report Created: 27/03/2013
### Objectives Information

<table>
<thead>
<tr>
<th>Objective</th>
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<tr>
<td>OB1</td>
<td>Prevent deterioration objective</td>
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<tr>
<td>OB2</td>
<td>Restore at least good status objective</td>
</tr>
<tr>
<td>OB3</td>
<td>Reduce chemical pollution objective</td>
</tr>
<tr>
<td>OB4</td>
<td>Protected areas objective</td>
</tr>
<tr>
<td>OB5</td>
<td>Northern Ireland Environment Agency objective</td>
</tr>
<tr>
<td>OB0</td>
<td>Overall objectives</td>
</tr>
</tbody>
</table>

### Extended Timescales

Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

### Objectives

In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter’s likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.
### Measures Report

**Water Management Unit:** IE_SH_Fergus  
**WaterBody Category:** River Waterbody  
**WaterBody Name:** Ballycullinan, Trib of Fergus  
**WaterBody Code:** IE_SH_27_1083  
**Heavily Modified:** No

<table>
<thead>
<tr>
<th>Measures Description</th>
<th>Applicable</th>
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<tbody>
<tr>
<td>BC</td>
<td>Total number of basic measures which apply to this waterbody</td>
</tr>
<tr>
<td>BW</td>
<td>Directive - Bathing Waters Directive</td>
</tr>
<tr>
<td>BIR</td>
<td>Directive - Birds Directive</td>
</tr>
<tr>
<td>HAB</td>
<td>Directive - Habitats Directive</td>
</tr>
<tr>
<td>DW</td>
<td>Directive - Drinking Waters Directive</td>
</tr>
<tr>
<td>MAE</td>
<td>Directive - Major Accidents and Emergencies Directive</td>
</tr>
<tr>
<td>EIA</td>
<td>Directive - Environmental Impact Assessment Directive</td>
</tr>
<tr>
<td>SS</td>
<td>Directive - Sewage Sludge Directive</td>
</tr>
<tr>
<td>UWT</td>
<td>Directive - Urban Waste Water Treatment Directive</td>
</tr>
<tr>
<td>PPP</td>
<td>Directive - Plant Protection Products Directive</td>
</tr>
<tr>
<td>NIT</td>
<td>Directive - Nitrates Directive</td>
</tr>
<tr>
<td>IPC</td>
<td>Directive - Integrated Pollution Prevention Control Directive</td>
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<tr>
<td>SUS</td>
<td>Other Stipulated Measure - Promotion of efficient and sustainable water use</td>
</tr>
<tr>
<td>DWS</td>
<td>Other Stipulated Measure - Protection of drinking water sources</td>
</tr>
<tr>
<td>ABS</td>
<td>Other Stipulated Measure - Control of abstraction and impoundment</td>
</tr>
<tr>
<td>POI</td>
<td>Other Stipulated Measure - Control of point source discharges</td>
</tr>
<tr>
<td>DIF</td>
<td>Other Stipulated Measure - Control of diffuse source discharges</td>
</tr>
<tr>
<td>PS</td>
<td>Other Stipulated Measure - Control of priority substances</td>
</tr>
<tr>
<td>MOD</td>
<td>Other Stipulated Measure - Controls on physical modifications to surface waters</td>
</tr>
<tr>
<td>OA</td>
<td>Other Stipulated Measure - Controls on other activities impacting on water status</td>
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<tr>
<td>AP</td>
<td>Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents</td>
</tr>
<tr>
<td>TP1</td>
<td>WSIP - Agglomerations with treatment plants requiring capital works</td>
</tr>
<tr>
<td>TP2</td>
<td>WSIP - Agglomerations with treatment plants requiring further investigation prior to capital works</td>
</tr>
<tr>
<td>TP3</td>
<td>WSIP - Agglomerations requiring the implementation of actions identified in Shellfish PRPs</td>
</tr>
<tr>
<td>TP4</td>
<td>WSIP - Agglomerations with treatment plants requiring improved operational performance</td>
</tr>
<tr>
<td>TP5</td>
<td>WSIP - Agglomerations requiring investigation of CSOs</td>
</tr>
</tbody>
</table>

Date Reported to Europe: July 2010  
Date Report Created 27/03/2013
Measures
Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in 'River Basin Planning Guidance' and in other documents in our RBMP Document Library at www.wfdireland.ie.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Status</th>
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<tbody>
<tr>
<td>TP6</td>
<td>WSIP - Agglomerations where existing treatment capacity is currently adequate but predicted loadings would result in overloading</td>
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<td>OTS</td>
<td>On-site waste water treatment systems</td>
<td>Yes</td>
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<tr>
<td>FPM</td>
<td>Freshwater Pearl Mussel sub-basin plan</td>
<td>No</td>
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<tr>
<td>SHE</td>
<td>Shellfish Pollution Reduction Plan</td>
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<tr>
<td>IPR</td>
<td>IPPC licences requiring review</td>
<td>No</td>
</tr>
<tr>
<td>WPR</td>
<td>Water Pollution Act licences requiring review</td>
<td>No</td>
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<tr>
<td>FOR</td>
<td>Forestry guidelines and regulations</td>
<td>Yes</td>
</tr>
<tr>
<td>CH1</td>
<td>Chanelisation measures</td>
<td>No</td>
</tr>
<tr>
<td>CH2</td>
<td>Chanelisation investigations</td>
<td>No</td>
</tr>
<tr>
<td>OG</td>
<td>Overgrazing measures</td>
<td>No</td>
</tr>
<tr>
<td>HQW</td>
<td>Protect high quality waters</td>
<td>No</td>
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</tbody>
</table>

Date Reported to Europe: July 2010
Date Report Created 27/03/2013
Monitoring Data for Toormore (Ruan)
The discharge from the Waste Water Treatment Plant. (WWTP) serving the Toormore (Ruan) agglomeration is to a percolation area, there is no monitoring data available for the discharge.
Monitoring and Sampling Points for Toormore (Ruan)
Monitoring Program for Emissions from the WWTP at Toormore (Ruan)

It is proposed to put in place provisions for monitoring the inlet waste stream and effluent emissions from the WWTP on a biannually basis for the parameters Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Suspended Solids (SS). Methods of analysis used will be in accordance with Standard Methods for the Examination of Water and Wastewater.

A map showing the location of the discharge point, P(GW1), prior to discharge to the percolation area is provided in Attachment B.1.
Wastewater Frequency and Quantities for Toormore WWTP

Ruan
Wastewater Flow volumes

No flow data is available for the WWTP, however the WWTP was designed to serve a population equivalent (PE) of 93, which equates to an average daily flow of 16.74 m$^3$ if based on an hydraulic load of 180 litres/head/day.
SCHEMATIC OF FLOW PATH

PLAN VIEW

Attachment C.1.1 Toormore (Ruan) WWTP layout

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Description of WWTP at Toormore (Ruan)
Waste Sources
Domestic wastewater is the only component of discharge to the Toormore wastewater treatment plant (WWTP) in Ruan. Up until 2005, the housing development was served by a septic tank unit, with limited pipe work. The collection pipe network has now been extended and a secondary treatment unit has been installed as end of pipe treatment. There are no commercial or industrial sector discharges to the plant or proposals to increase the population served by the WWTP. There are no pumping stations in the agglomeration and no storm overflows.

The site layout of the WWTP is provided in Attachment C.1.1. A map indicating the agglomeration served by the Toormore WWTP and the location of the new wastewater treatment facility is provided as Attachment B.1 Map of the Ruan agglomeration serving the Toormore WWTP Site & Discharge Point.

Wastewater Flow volumes
No flow data is available for the WWTP, however the WWTP was designed to serve a population equivalent (PE) of 93, which equates to an average daily flow of 16.74m³ when based on an hydraulic load of 180 litres/head/day.

Treatment Process Description
The wastewater treatment unit serving the development comprises of a Kee 0975 NuDisc unit, which is a self contained unit consisting of:
- Primary settlement,
- Rotating Biological Contactor (RBC) for the biological stage
- Settlement and clarification.
- Final discharge to a percolation area via a sand polishing filter and UV system.

Administration Control House
The control room houses the control panel for the treatment plant, the sand filter and backwash pumps.

Sludge Management
Sludge is removed off-site as required.

Combined storm overflows
The sewer system is a foul only collection system, with no storm overflow facility in place.
Significant Correspondence
Correspondence in relation to treatment of wastewaters in Ruan village was received by Clare County Council on October 1st 2009 – Ref: PAE2009/189. The correspondence arose in response to a complaint sent to the EPA regarding:

1. Effluent discharge to Turlough at Kilfenora.
2. Effluent discharge to River Fergus at Corofin.
3. Effluent discharge to River Fergus at Ruan.

The complainant had been in correspondence with the Council via the Access to Environmental Regulations, 2007 (AIE Regulations) since the previous April 2009. The initial contact related to the discharge of effluent from Kilfenora WWTP but following the initial response from the Council, the complainant also included references to effluent discharges to the River Fergus from both Corofin and Ruan.

Clare County Council responded to the EPA correspondence on December 16th 2009 and a copy of the response was forwarded to the complainant. The response advised that there is no wastewater treatment plant in place to serve Ruan village, rather there are two package plants in place serving two small housing estates. Wastewater treatment is provided at:

1. WWTP to serve Council housing estate which provides wastewater treatment for 32 houses at Toormore, Ruan, and which is the subject of this application.
2. WWTP operated by Clare County Council to serve Rural Housing Organisation housing estate which provides wastewater treatment for 20 houses.

The emissions from both WWTPs discharge to percolation areas rather than directly to surface waters.

A summary of the correspondence is provided in Table 1 below and copies of the correspondence is provided as Attachment B.10.1.

**Table 1 Summary of Correspondence**

<table>
<thead>
<tr>
<th>Date</th>
<th>Correspondence</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/04/2009</td>
<td>Request for information pursuant to Access to Information on the Environmental (AIE) Regulations, 2007 re Kilfenora WWTP</td>
</tr>
<tr>
<td>14/05/2009</td>
<td>Response issued by Clare Co. Co. Ref: AIE/02/2009/FMcN/KL</td>
</tr>
<tr>
<td>15/05/2009</td>
<td>Request for clarification to Response Ref: AIE/02/2009/FMcN/KL</td>
</tr>
<tr>
<td>19/05/2009</td>
<td>Letter of formal complaint to Ger Dollard DOS, re the discharge of effluent from Kilfenora WWTP</td>
</tr>
<tr>
<td>22/05/2009</td>
<td>Response issued by Clare Co. Co. re letter of 19/05/2009</td>
</tr>
<tr>
<td>11/06/2009</td>
<td>Response issued by Clare Co. Co. re Ref: AIE/02/2009/FMcN/KL dated 15/05/2009</td>
</tr>
<tr>
<td>15/06/2009</td>
<td>Request for clarification to Response dated 11/06/2009 Ref: AIE/02/2009/FMcN/KL</td>
</tr>
<tr>
<td>29/06/2009</td>
<td>Response issued by Clare Co. Co. re Ref: AIE/02/2009/FMcN/KL dated 15/06/2009</td>
</tr>
<tr>
<td>10/07/2009</td>
<td>Letter of formal complaint to Co. Manager Clare Co. Co. re the discharge of effluent to groundwater and surfacewater from Kilfenora, Corofin and Ruan WWTPs. Letter copied to: Gerard Dollard DOS; David Timlin DOS; Sean Ward Senior Engineer – Clare Co. Co.; Michael Lehane; Dara Lynott – EPA; Minister of Environment, Heritage and Local Government</td>
</tr>
<tr>
<td>01/10/2009</td>
<td>PAE2009/189 re Complaint to EPA dated 25/09/2009 re Discharge to Kilfenora Turlough – reference also made to treatment of wastewaters in Ruan.</td>
</tr>
<tr>
<td>07/10/2009</td>
<td>Letter to complainant acknowledging receipt of complaint sent to the EPA Ref: PAE2009/189</td>
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<tr>
<td>09/10/2009</td>
<td>Letter from complainant re PAE2009/189</td>
</tr>
<tr>
<td>16/12/2009</td>
<td>Response issued by Clare Co. Co. re PAE2009/189</td>
</tr>
</tbody>
</table>
16th December 2009.

Ms. Yvonne Doris
Environmental Protection Agency,
Office of Environmental Enforcement,
Headquarters,
PO Box 3000,
Johnstown Castle Estate,
Co. Wexford.

Re: Discharge to Kilfenora Turlough – PAE2009/189

Dear Ms. Doris,

In relation to the above complaint which was received in our office on the 05th October 2009, I wish to reply as follows:-

This complaint refers to three locations of Clare County Council discharges.

- **Turlough Kilfenora**
  The discharge is currently directly to a swallowhole (groundwater, not a turlough). This discharge is the subject of a scheme upgrade funded under the Water Services Investment Programme (WSIP) which deals with the discharge. Clare County Council is currently waiting approval of a Preliminary Report from the Department of Environment, Heritage and Local Government (DEHLG) subject to normal clarifications/reporting. The Environmental Laboratory Staff of Clare County Council are dealing with the licencing requirements under the EPA Licence.

- **River Fergus (Corofin)**
  A new Waste Water Treatment Plant is currently under construction in Corofin and will be commissioned in February 2010. The discharge will meet all EU and National requirements and is subject of an EPA discharge licence (currently being processed).
Toormore Ruan Waste Water Treatment Plant

There is no waste water treatment plant for the village of Ruan but there are two small packaged treatment plants in place – one is for the Council housing estate at which provides wastewater treatment for 32 houses at Toormore Ruan. The plant is a KEE 0975 NuDisc. Clare County Council currently have a service contract with Enviro Services Limited for the maintenance of this plant.

In September 2009 the plant malfunctioned and it transpired that the gearbox of the plant required repair. Significant work was carried out on the plant since September and it is operating satisfactorily. The other plant is taken care of by the Water Services Section of Clare County Council for North Clare. This plant serves the Rural Housing Organisation (RHO) houses in Ruan. The plant was designed and installed by Mahon and McPhillips and is typical of the plants which were used for these housing estates at the time. It is a Rotating Biological Contractor and contains three distinct stages of treatment primary, secondary and a final settlement tank. The treated effluent is then discharged to a percolation area.

Your sincerely,

Betty Devanny
Environmental Complaints Co-ordinator,
Environment & Water Services Directorate.

CC – Mr. Michael Duffy, 1 Clós Na hEaglaise, Kilfenora, Co. Clare.
Mr. Steve Lahiffe, A/Senior Executive Engineer, Ennistymon Area Office
Ms. Siobhan McNulty, A/Senior Executive Engineer, Housing Section.
Ms. Betty Devaney  
Environmental Complaints Co-Ordinator,  
Clare County Council,  
Áras Contae an Chlár,  
New Road,  
Ennis,  
Co. Clare

A Chara,

Thank you for letter of 7th October 2009. I would like to point out that the letter to which you refer originated from the enforcement section of the EPA, and not from me. Please note that along with the discharge of effluent at the Kilfenora Tarlough, my complaint to the EPA included discharge of effluent by Clare County Council (CCC) at Corofin, to the river Fergus, and at Ruan to groundwater. If you wish, I have no objection to the EPA supplying a copy of the C3 complaint to you. For the record, I made a formal complaint to CCC on 19th May 2009 regarding the Kilfenora discharge and another on the 16th July 2009 regarding the other two discharges. All three discharges are on-going, and CCC has no discharge licence of certificate for any of these.

Yours Sincerely,

Michael Duffy.

cc. Yvonne Doris EPA.
07th October 2009.

Mr. Michael Duffy
1 Clós Na hEaglaise,
Kilfenora,
Co. Clare.

Re: Discharge to Kilfenora Turlough – PAE2009/189

Dear Mr. Duffy,

I acknowledge receipt of your letter dated 01st October 2009 regarding the above.

I am having this matter investigated and will revert back to you as soon as possible.

Yours sincerely,

Betty Devanny
Environmental Complaints Co-ordinator,
Environment & Water Services Directorate.
MRS BETTY DEVANEY
ENVIRONMENTAL COMPLAINTS COORDINATOR
CLARE COUNTY COUNCIL
ENVIRONMENT AND EMERGENCY SERVICES
DIRECTORATE
BLOCK B, IAPE BUILDING
GORT ROAD, ENNIS
CO. CLARE

01/10/2009

RE: DISCHARGE TO KILFENORA TURLOUGH—PAE2009/189.

DEAR MRS DEVANEY,

THE AGENCY HAS RECEIVED A COMPLAINT CONCERNING THE ABOVE REFERENCED MATTER. A COPY OF SAME IS ENCLOSED FOR YOUR ATTENTION AND ACTION.

IT IS ADVISABLE THAT CLARE COUNTY COUNCIL TAKES ALL STEPS TO INVESTIGATE AND RESOLVE THIS ISSUE, UTILISING ALL APPROPRIATE ENFORCEMENT ACTION AS NECESSARY. YOUR COUNCIL IS ALSO REQUESTED TO DIRECTLY CONTACT THE COMPLAINANT IN RELATION TO THIS MATTER AND TO ADVISE THE COMPLAINANT THAT CLARE COUNTY COUNCIL IS INVESTIGATING AND DEALING WITH THE COMPLAINT.

THE REFERRAL OF THIS COMPLAINT TO CLARE COUNTY COUNCIL CLOSES OUR FILE ON THIS ISSUE. THIS IS NOW A MATTER FOR YOUR COUNCIL TO FOLLOW UP AND INVESTIGATE AS APPROPRIATE.

THE EPA PERSON DEALING WITH THIS FILE IS YVONNE DORIS TO WHOM ALL CORRESPONDENCE AND QUERIES IN RELATION TO THE MATTER SHOULD BE ADDRESSED.

PLEASE USE THE REFERENCE NUMBER ABOVE IN ALL FUTURE COMMUNICATIONS WITH THE OEE REGARDING THIS MATTER.

YOURS SINCERELY,

YVONNE DORIS
OFFICE OF ENVIRONMENTAL ENFORCEMENT

CC: MR MICHAEL DUFFY, KILFENORA, CO. CLARE
CONCERNING LOCAL AUTHORITY ENVIRONMENTAL PROTECTION
RESPONSIBILITIES

If you have a query or complaint about general environmental pollution matters or about facilities under the control of local authorities, you should always contact the relevant local authority in the first instance, preferably in writing. Always keep a copy of any correspondence between yourself and a local authority and details of phone calls. If a local authority has failed to respond to your complaint and the environmental pollution problem persists, please fill out this form and submit the relevant details, including copies of your correspondence to your local authority, to:

Environmental Complaints Unit
Office of Environmental Enforcement
Environmental Protection Agency
P.O. Box 3000
Johnstown Castle Estate
Co. Wexford

Email: info@epa.ie

The OEE will, generally, only investigate complaints relating to local authority functions where there is clear evidence that the local authority has been made aware of the complaint and been given an opportunity to deal with and resolve the issue. It is therefore important that you provide the OEE with details of your contacts with the relevant local authorities. You should note that information submitted may be forwarded to the relevant Local Authorities for the purposes of investigation. Information submitted to the OEE is also subject to the provisions of the Freedom of Information Act 1997.

Having completed this form, please also send copies of any correspondence or other supporting information such as photographs and maps to the above address.

Please complete this form in BLOCK LETTERS.

1. Your Name: Michael Duffy
2. Address: 1 Clòs Na hEaglaise, Kilfenora, Co. Clare.
3. Telephone Number: 065 7088088 ; 086 2557258
4. Fax: N/A
5. E-mail address: duffycivileng@gmail.com

6. The name of the relevant Local Authority: Clare Co. Co.

7. Name and Address of the industry, site, facility or individual to which the complaint relates. Please provide description of the location including identifying landmarks and directions from nearest town/village if available. Please continue on a separate sheet if necessary.:

Effluent discharge to Turlough at Kilfenora; ING 117481,193567
Effluent discharge to river Fergus at Corofin
Effluent discharge to river Fergus at Ruan.

8. Fullest possible account of facts giving rise to the complaint (INCLUDING TIME, DATE AND DURATION OF OCCURRENCE). The description should be as specific as possible and concentrate on the facts surrounding the issue being complained about. If you have photographs please include copies with this form.:

CCC is discharging on average, 237m$^3$/day of WWT effluent to groundwater via a karst conduit in Kilfenora. There are no assimilative capacity calculations for this discharge. This is an illegal discharge for which CCC has no certificate. Flow velocity at this discharge point has been recorded at between 60-300 m/hr. This in theory could allow this effluent to be at the Ennis potable source in 3 – 15 days.

As CCC has no records of the volumes of discharges from either Corofin or Ruan, I will make an educated guess. I suggest 600m$^3$/day from Corofin and 200m$^3$/day from Ruan. Thus CCC is allowing approximately 1000m$^3$/day of poorly treated effluent into the potable water catchment for Ennis and environs. Can I respectfully suggest this is part of the problem with the on-going problem with potable water for Ennis town, which is sourced from this catchment.

9. Details of the approaches already made (by telephone or in writing) to the local authority (attach copies of correspondence). Please include the local authority contact name if available.:

As Attached
10. Have you reported your complaint to the Illegal Dumping Line (1850 365 121)? N/A

11. Have you contacted the OEE previously in relation to this complaint? If Yes, provide details of most recent contact.
   No.

12. Details of any approaches that you already made to other authorities (e.g. Department of the Environment, Heritage and Local Government, Fisheries Board, European Commission). Please include copies of your correspondence with this form:
   None

13. Details of any court or other legal actions that you have already taken in relation to the issue being complained about.
   None.

14. Confidentiality
   Please tick V beside the statement below if you wish to EPA not to disclose your identity in its investigation of this matter.

   I request the EPA not to disclose my identity in its investigation of this matter. No preference

15. Date and Signature of complainant:

   DATE: 25th September 2009
   SIGNATURE: [Signature]

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Mr. Tom Coughlin,
County Manager
Clare County Council,
Áras Contae an Chláir,
New Road,
Ennis,
Co. Clare

10/07/09

A Chara,

Thank you for your reply of 29th May 2009. I have since also had replies from Mr. Gerard Dollard, Director of Services, Community & Enterprise, and from Mr. Seán Ward, Senior Engineer, Water Services, both of which I am grateful for.

I find Mr. Dollard’s reply disingenuous. I did not seek a spin on the quality of other bathing waters in County Clare, which by implication, may retain their “Good” status by virtue of the sampling locations chosen. The lack of designation is not a mitigating factor for pollution. My particular interest in Ballyalla Lake stems from the fact that it incorporates the Pouladower Spring and is in close proximity to the Drumcliff Spring. While it is believed that these springs are independent, it is by no means conclusive. In particular it is quite possible, if not probable that these sources are connected to the North West, outside Corofin. As you know, the Drumcliff Spring is the source of potable water for Ennis and environs. Two reports, presented in February 2000 by Jenny Deakin, Geological Survey of Ireland et al, go into some detail in relation to source protection for both of these springs. In light of the experience with water quality in Ennis since these reports were published, I believe that there is a much more significant connection.

I accept that the problem with bathing water quality in Ballyalla Lake is partly due to the “numerous small farms” and the “scattered rural domestic housing and tourist accommodation”, mentioned as “potential pollution sources” in these reports. However, more importantly, and not mentioned in these reports, is the unquantifiable volume of effluent from three WWTP’s which Clare County Council are
contributing to this water system. I say more importantly, because as the regulatory body for environmental pollution in the first instance, CCC’s actions in this regard are possibly criminal, in that, it has the knowledge and expertise to be aware of the consequences of its actions. The individuals in the “numerous small farms” and the “scattered rural domestic housing and tourist accommodation” may not be as enlightened. Incidentally, I’m sure there is no need to remind you that these people, through their rates, water charges, planning contributions etc. help fund the Council. A cynic could be forgiven for suggesting that CCC, and in particular, Mr. Dollard, would have been better employed in concentrating on arranging both funding and engineering solutions to these effluent discharges, rather than visiting the USA with the begging bowl to fund the perceived honey pot of the Cliff’s of Moher.

Waste water treatment is arguably as important an infrastructural issue as roads. It is infinitely more important than constructing aesthetically pleasing walls at the side of road realignment works, which CCC have lavishly embraced in recent years.

CCC is discharging on average, 237m³/day of WWT effluent to groundwater via a karst conduit in Kilfenora. There are no assimilative capacity calculations for this discharge. This is an illegal discharge for which CCC has no certificate. Flow velocity at this discharge point has been recorded at between 60-300 m/hr. This in theory could allow this effluent to be at the Ennis source in 3 – 15 days.

“Water quality at Pouladower is generally relatively good with low levels of chemical contaminant indicators such as chloride, nitrate and potassium. The bacteriological analyses however, often show the presence of faecal coliforms (E. coli), although this is typical in a karst spring where groundwater travel times are often much less than 100 days**”.

*Bacteria and most viruses will not live longer than 100 days in groundwater. Deakin 2000.

“Water quality at Drumcliff fluctuates throughout the year with the poorer quality analyses being returned during the winter months and during periods of heavy rainfall. Colour, turbidity and iron have all exceeded the EC Drinking Water Directive maximum admissible concentrations (MAC) on occasion almost every year. Total coliforms and E. coli are also often present”. Deakin 2000.

As CCC has no records of the volumes of discharges from either Corofin or Ruan, I will make an educated guess. I suggest 600m³/day from Corofin and 200m³/day from Ruan. Thus CCC is allowing approximately 1000m³/day of poorly treated effluent into the potable water catchment for Ennis and environs. Can I respectfully suggest this would be a good starting point for determining why Ballyalla Lake is not attaining bathing water standards?

The average on-site treatment system produces 1m³/day of effluent. While a significant % of these in this area may not be treating waste water correctly, the vast majority will have some degree of soil retention of the effluent before it enters surface/groundwater. It is quite reasonable to suggest that CCC is the dominant polluter of these waters. The fact that it is tasked with planning regulation and enforcement of on-site treatment systems, and now farm inspections, is an abomination, considering its roll as a polluter.
You will no doubt cite a lack of capital for resolving these issues in the past. We all know how infinitely more difficult this is going to be in the future. I am not suggesting that you alone or your predecessors are solely responsible for this situation, but the buck locally, stops on your desk.

I have a major issue with CCC’s policy in relation to on-site waste water treatment systems (WWTS’s). An EPA manual on this issue has been available for guidance since 2000. CCC started a policy of site suitability assessment in 2004. It regularly (if not always) conditions supervision of the installation of these systems. CCC planning dept. has no idea of how many of these planning permissions are in compliance. This was a perfect opportunity to draw a line in the sand and ensure that any system installed after commencement of this policy was correct. The ridiculous situation about this is that onerous planning conditions have stipulated expensive systems and processes, which in a large % of cases have been incorrectly installed because the supervision is a joke, if it is actually carried out at all. This is a major flaw in its policy. It is one thing telling a home owner, who installed a septic tank and sump, 25 years ago for £500, that they will have to stop polluting groundwater by now installing a system. Would you like to be telling the homeowner, who installed a €10,000 system two years ago, that they have to replace their polishing filter? You may say that CCC is covered legally (which has yet to be tested), but it certainly is not covered morally. If CCC (an all LA’s) thinks that creating the roll of “Site Suitability Assessor”, with indemnity insurance, solves this problem, they are mistaken. If LA’s see the need to distance themselves from this liability, then they should remove themselves from the process. I argue that if a professional engineer assesses, designs, supervises and certifies an installation to EPA standards, then LA’s need not be involved. This would be similar to other aspects of construction e.g. foundation design, roof design etc. It should be a condition of all planning permissions that a professional should have to certify compliance within the duration of the permission. This should be proper compliance and supervision. The professional must commit to supervise the construction from the start, and inspect all aspects of works before they are covered up. The professional bodies have an urgent job to do to explain to their members that certification & supervision mean what they say.

I have an instance where I, as a professional engineer, supervised and certified all aspects of the installation of a polishing filter, yet CCC informed my client that he was not in compliance because I was not a “member of the panel”. I know of numerous cases where “panel members” have certified work which is incorrect and also designed systems (later conditioned in permission by CCC) which are incorrect. Can you explain how CCC can condition supervision by a “panel member” yet it does not condition prohibiting under-sink macerators (ref. S.Ward). Forming another level of “consultant” as in the “waste water panel” is a ridiculous waste of resources. LA’s should be striding to consolidate the planning/building process instead of diversifying it. Consolidation is the only way that the sentiments expressed by Sean Ward (“Need for local stakeholders to be on board with local measures”), in his presentation to Engineers Ireland Conference April 2009, can be achieved. I have no problem competing with any amount of other Engineers or Architects for work, but I shouldn’t have to compete with a part-time farmer who sat a 7 day FAS course. Neither should I have to employ this part-time farmer to supervise my work in order to satisfy a condition of planning.
Through my interest in on-site treatment systems and site assessment, I am aware that Kilfenora and an extensive area to the South East are in the Outer Area for Source Protection of the Ennis Source (I agree with this designation). As you probably know, this designation demands more onerous conditions in relation to on-site WWTS. It seems grossly unfair that CCC should condition these elevated standards, yet at the same time feels free to discharge effluent to surface and groundwater within this zone.

I am grateful to Mr. Sean Ward for his description of the DBO process and the basic requirements of CCC for the water treatment plant. It is only logical to assume that the poorer the quality of the raw water, the higher the tender price of the DBO. CCC have, through their own doing, created a situation where they were forced to undertake this DBO at a time when the raw water is at its worst. If the WFD is to be implemented, the quality of raw water will only improve in the future. If CCC addressed the effluent discharges which I refer to, at an earlier stage, then this DBO might have been significantly less costly.

I have already made a formal complaint about the discharge to groundwater from Kilfenora WWTP. I wish to now make a formal complaint about the discharge of effluent to surface waters at Corofin, without a discharge licence, and the discharge of effluent to groundwater at Ruan without a discharge certificate.

Yours Sincerely,

_________________________

Michael Duffy.

c.c.

Mr. Gerard Dollard CCC
Mr. David Timlin CCC
Mr. Sean Ward CCC
Dr. Michael Lehane EPA
Mr. Dara Lynott EPA
Minister for Environment, Heritage & Local Government.
29th June, 2009.

Mr. Michael Duffy,
1 Clós na hEaglaise,
Kilfenora,
CO. CLARE.


Dear Mr. Duffy,

I refer to your request under the Access to Information on the Environment Regulations 2007 for details relating to the Corofin and Ruan Wastewater Treatment Plants (WWTP).

A decision was made on your request by me on 29th June, 2009. I may be contacted by telephone on 065-6848387 and will seek to answer any questions you may have and to assist you generally in this matter.

In response to your request, I have decided to grant your request as follows:

1) Results of Corofin and Ruan WWTP for 2008 are enclosed.

2) Daily Flow from the above – we do not have flow recorders in place.

3) The discharge for Corofin is to the River Fergus. The discharge for Ruan is to groundwater.

You may appeal this decision by writing to Mr. Michael McNamara, SEO, Corporate Services, Clare County Council, New Road, Ennis, Co. Clare and requesting an internal review of your application. You must make your appeal within 1 month of receiving this letter. The appeal process will involve a complete reconsideration of the matter by a senior member of the staff of this Council.

Yours sincerely,

Betty Devanny,
Administrative Officer,
Environment & Emergency Services Directorate.

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Environment Department,
Clare County Council,
Aras Contae an Chláir,
New Road,
Ennis,
Co. Clare

1 Clós na hEaglaise,
Kilfenora,
Co. Clare.

15/06/09

Your Ref: AIE/02/2009/FMeN/KL

A Chara,

Further to your reply of 11/06/09 to clarification requested regarding the above, can you indicate how the Assimilative Capacity Calculations were carried out for this discharge location? While I fully accept the flow velocity quoted, what Q value is being attributed to this conduit? Can you indicate the Allowable Discharge Concentration in mg/l for this discharge point? Please define the boundaries of the Source Protection Area for the Drumcliff Spring and on what basis is this delineation defined.

Regards,

Michael Duffy.
Our Ref: AIE/02/2009/FMcN/KL

11th June, 2009.

Mr. Michael Duffy,
1 Clós na hÉaglaise,
Kilfenora,
CO. CLARE.

RE: AIE Request – Kilfenora Waste Water Treatment Plant

Dear Mr. Duffy,

I refer to your letter of 15th May regarding the above and wish to respond as follows:

- The units used in item No. 3 are meters per hour (flow rate).

- In relation to item No. 4 re. the groundwater map for the Pouladower/Drumcliff borehole, there is a groundwater source protection plan in place for the Drumcliff spring (source for Ennis public water supply). This plan is used when planning developments in the catchment are assessed. Even though a source protection plan was prepared for the Pouladower Spring as it was being considered as a possible source for Ennis public water supply, this no longer applies so we are not required to take the source protection plan into consideration when planning applications come in. The GSI are also aware of this.

Yours sincerely,

Betty Devanny,
Administrative Officer,
Environment & Emergency Services Directorate.
22nd May, 2009.

Mr. Michael Duffy,
1 Clóis Na hEaglaise,
Kilfenora,
CO. CLARE.

Dear Mr. Duffy,

I refer to your letter of 19th May, 2009 regarding the Kilfenora Waste Water Treatment Plant. I note that information was provided to you under the Access to Information on the Environment Regulations on 14th May, 2009.

This plant is operated by Clare County Council and comes within the remit of the Water Services Directorate. The Environment Department is, of course, involved in terms of the overall environmental monitoring at the location. I have forwarded a copy of your letter to Mr. David Timlin, Director of Services in the Water Services Department, who I am sure will be in contact with you directly.

Yours sincerely,

-------------------------------------------------

Gerard Dollard,
Director of Services,
Environment & Emergency Services Directorate.

c.c.  Mr. D. Timlin, Director of Services.
I Clós Na hEaglaise,
Kilfenora,
Co. Clare.

19/05/09

Mr. Ger Dollard,
Director of Service,
Environment and Emergency Services Directorate.

Dear Mr. Dollard,

I would like to make a formal complaint regarding the discharge of a significant volume of effluent from the Waste Water Treatment Plant (WWTP) at Kilfenora on a continuous basis. This effluent is being discharged directly to groundwater without a pollution licence.

Yours Sincerely,

Michael Duffy.
I Clós na hEaglaise,
Kilfenora,
Co. Clare.

15/05/09

Environment Department,
Clare County Council,
Aras Contae an Chláir,
New Road,
Ennis,
Co. Clare

Your Ref: AIE/02/2009/FMeN/KL

A Chara,

Thank you for your reply to my request for information relating to Kilfenora Waster Water Treatment Plant (WWTP). It would appear that the units quoted are a flow velocity rather than a flow rate. Could you clarify the units used at Item No.33 in relation to Item No. 4, the Geological Survey of Ireland (GSI) defines a Source Protection Area on its Groundwater Map for the Pouladower/Drumcliff borehole. The outer area (SO) of this protection area extends to Kilfenora village. The GSI state that Source Protection Area’s are compiled in collaboration with Local Authorities. If this area, as defined, is incorrect, then significant additional requirements are being placed on individuals planning on-site WWT systems, due to the higher protection response required in a Source Protection Area. Could you clarify this anomaly?

Regards,

Michael Duffy.

Dear Mr. Duffy,

I refer to your request under the Access to Information on the Environment Regulations 2007 for details relating to Kilfenora Wastewater Treatment Plant (WWTP).

A decision was made on your request by me on 14th May, 2009. I may be contacted by telephone on 065-6846387 and will seek to answer any questions you may have and to assist you generally in this matter.

In response to your request, I have decided to grant your request as follows:

1) The monthly results of analysis of the Kilfenora WWTP for 2008 is enclosed.
2) The average daily flow for 2008 was 237 m3/day.
3) At low water levels, the flow rate from the Ballybreen swallowhole is 60-125 m3/h, at high flow rates the flow is 150-300 m3/h.
4) There is no source protection zone active in the Kilfenora area.

You may appeal this decision by writing to Mr. Michael McNamara, SEO, Corporate Services, Clare County Council, New Road, Ennis, Co. Clare and requesting an internal review of your application. You must make your appeal within 1 month of receiving this letter. The appeal process will involve a complete reconsideration of the matter by a senior member of the staff of this Council.

Yours sincerely,

Betty Devanny,
Administrative Officer,
Environment & Emergency Services Directorate.

Clare County Council is an equal opportunities employer and welcomes applications from all sections of the Community.
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1 Clòs na hEaglaise,
Kilfenora,
Co. Clare.

15/04/09

Environment Department,
Clare County Council,
Áras Contae an Chlár,
New Road,
Ennis,
Co. Clare

A Chara,

Under AIE regulations 2007 (Directive 2003/35 EC / S.I.133 of 2007) I request the following information:

1. Results for the past 12 months of the quality of effluent from the Kilfenora waste water treatment works, which is being discharged to groundwater.
2. An estimate of the daily flow being discharged to groundwater.
3. Dilution figures for the design of this discharge.
4. Policy or terms of reference for the Councils input into the delineation of the outer source protection zone in the Kilfenora area.

I will accept the relevant information in any form.

regards,

Michael Duffy.
Clare County Council – Planning Section

REPORT TO MEMBERS

File Reference: LA01/6
Development: Construction of 16no. houses and ancillary services
Location: Tooremore, Ruan

Nature and extent of the proposed development and the principle features thereof.
It is proposed to construct 16no. houses and ancillary services adjacent to the Tooremore Local Authority Housing Estate, to be served by a road layout accessed via the existing housing estate road. The dwellings are to be served by a proprietary wastewater treatment plant and sand polishing filter located to the west of the proposed dwellings in public open space. The plant will also be connected to the existing 16no. dwellings in the vicinity. Water supply is proposed from the existing public mains. The proposal will involve the demolition of an existing dwelling.

Evaluation of the likely implications, if any, of the proposed development with respect to the proper planning and development of the area in which the development would be situated.

• The siting and density of the proposed development in relation to the village of Ruan is appropriate
• Dwelling designs are appropriate to the location and the mix of house types is satisfactory. Rear garden space is restricted on some dwellings, while the set back from the front boundary is at maximum.
• The proposed road layout is satisfactory. The dwellings directly fronting the public road (no's 15 and 16) appear to have adequate forward sight distances in both directions. Measures to ensure the safe reversing movements onto the public carriageway are required for the two dwellings.
• Pedestrian linkage throughout the proposed estate is adequate.
• There was no street lighting scheme submitted.
• Parking provision is satisfactory
• Water supply is via the existing mains
• Sewerage Disposal is proposed via a Treatment Plant, the type and location of which is not acceptable, due to a) unfavourable soil and bedrock conditions; b) the location of the site in an area high groundwater vulnerability and within the catchment area of the Pouladower Springs aquifer; c) location downwind and in close proximity to proposed and existing dwellings. This needs to be addressed.
• The total area provided for Public Open Space is adequate. Its location in the vicinity of the Sewerage Treatment Plant and above the percolation area is not acceptable and is of concern.
• Landscaping should retain the existing trees where possible. Provision should be made to screen the obtrusive 2m high site boundary wall to the southeast by means of planting and/or the use of stone facing to reflect the stone walls of the area.

List of persons or bodies who made submissions or observations.
There were no submissions or observations to date.

Summary of the issues with respect to the proper planning and orderly development of the area raised by persons making submissions.
There were no submissions or observations to date.

Response of the Local Authority thereto.
Not applicable

The manner in which the development is proposed to proceed
• It is considered that the Proprietary Waste Water Treatment System to be used should be revised in view of the A/S.E. Chemist report (2/8/2001).
✓• The proposal to locate the percolation area in public open space is unsatisfactory, and should be revised to in the interests of public health and amenity.
✓• The obtrusive visual impact of the 2m high boundary wall to the southwest should be reduced by the use of materials to reflect the existing stone walls in the vicinity and by planting. Existing trees on site should be retained where possible.
✓• Sight distances at proposed entrances of dwellings no’s.15 & 16 at the Public Road, and front garden layouts, need to safely cater for parking and reversing movements onto carriageway.
• Conditions of Road Design Report (27/7/2001) should be adhered to.
• Public lighting scheme needs to be addressed

If above concerns are satisfactorily addressed the proposed development will conform to the proper planning and development of the area.

Brian McCarthy
Assistant Planner
14/7/2001