

## 4.11 MATERIAL ASSETS - CULTURAL HERITAGE

### 4.11.1 INTRODUCTION

This section of the Environmental Impact Statement, undertaken by TES Consulting Engineers details the impacts, if any, which the proposed development will have on the cultural heritage and archaeology of the area. The following items are addressed in the archaeological and historical study:

- The nature, extent and locations of archaeological material on the site of the proposed development and in the general vicinity of the site; and
- Where archaeological material is shown to be present, the potential impact of the proposed development on the archaeology within the site shall be described in detail.

### 4.11.2 GLOSSARY

**Barony, Parish, Townland** These terms refer to land divisions in Ireland. The barony is the largest land division in a county, which is formed from a number of parishes. These parishes are in turn made up of several townlands, which are the smallest land division in the country. The origins of these divisions are believed to be in the Early Medieval/Christian period (AD500-AD1000), or may date earlier in the Iron Age (500BC-AD500).

**First Edition** This relates to editions of the Ordnance Survey 6 inch maps for County Dublin. The first edition map completed for the area dates to the early 1840's and this is referred to in the text as the "first edition".

**Third Edition** This relates to editions of the OS 6 inch maps for County Dublin. The third edition map completed for the area dates to the early 1940's and this is referred to in the text as the "third edition".

**LE** This number is the number of the site on the Sites & Monuments Record map. It begins with the county code, here for Leitrim the 6-inch sheet number, followed by the number of the archaeological site.

**OS** Ordnance Survey

**Ph** Parish

**SMR** Record of all known archaeological sites, which are indicated on a map and listed in an accompanying inventory. The sites marked afford legal protection under the National Monuments Acts 1930-1994. The register is based on the 6 inch map series for the country and are recorded on a county basis.

**Sheet** This relates to the six-inch map for County Leitrim, which are divided into sheets. The relevant Sheet for this project is Sheet No. 31.

**Votive** Given or consecrated in fulfillment of a vow.

### 4.11.3 EXISTING ENVIRONMENT

The proposed development entails the expansion of the wastewater treatment works adjacent to the existing site at Attirory. The proposed development at Attirory measures approximately 1.25 hectares. The site lies approximately 1.25km south east of Carrick-on-Shannon. It is accessed from a local tertiary road, which joins the N4 Dublin Sligo National Primary Route. The proposed development is located on the eastern bank of the River Shannon in an area of wet land. The development area is located within the former flood plain of the River Shannon, in an area of natural reclamation; although it is still prone to flooding during severe weather conditions.

#### 4.11.3.1 METHODOLOGY

The study comprised both a desk study and a field study. The desk study investigated both the archaeological and historical background of the area. It comprised an analysis of:

- Sites and Monuments Record (SMR) for the county of Leitrim compiled by the Office of Public Works;
- Three editions of the Ordnance Survey six-inch maps;
- Topographical Files, from the National Museum of Ireland;
- Aerial Photography;
- Development Plan for the town of Carrick-on-Shannon 1997-2002;
- General archaeological files and records; and
- Historical Sources.

---

#### 4.11.3.2 GENERAL ARCHAEOLOGICAL POTENTIAL OF THE RECEIVING ENVIRONMENT

Broadly speaking, the general landscape surrounding the proposed development offers many locations for differing habitation sites. These locations fall into four main categories:

- 1) **The river and stream valleys and areas of wet marshy ground:** these offer many opportunities for the location of Fulachta fiadh (cooking sites). These monuments are location specific and sometimes occur in groups.
- 2) **The River Shannon:** this would have provided an important food resource and route way in prehistoric times. Consequently, it is probable that settlements would have been dotted along the edges of the flood plain of the river, which, following their abandonment may have subsequently been covered by marsh/peat, which is characteristic of this type of topographical environment.
- 3) **The position of the present day Carrick-on-Shannon:** this crossing point on the River Shannon must have been realised and utilised as a crossing point during prehistoric times. In addition, the river would have been an important element in religious ritual during the prehistoric period, acting as a repository for votive offerings. Furthermore, it may have acted as a cultural barrier, which survives today as an element of provincial and county boundaries.
- 4) **The river bed and its banks:** these can serve as a repository for an array of historical and archaeological artefacts. During dredging works undertaken during the mid-nineteenth century a dug-out canoe and two polished stone axe-heads were recovered. Polished stone axes are known largely from the Neolithic period and are thought to have been high status items possibly used for trade and exchange. The fact that two were found suggests that these were more than stray finds and that this area and more importantly the river Shannon may have been utilised in that early period. Also in 1933 a well-preserved bronze sword was found in a bog near Carrick-on-Shannon. A bronze ladle was also found in the riverbed of the River Shannon. Ladles were used in secular and ecclesiastical context, thus suggesting settlement existed here in the Early Medieval period.

The area surrounding the sites under assessment is part of a landscape rich in historical and archaeological material. The region has attracted settlement from early times as is shown by the presence of monuments dating back to the prehistoric period. Continuity of settlement is illustrated by identified monuments ranging from the Neolithic to Medieval remains, with the majority of extant sites dating to the Late Iron Age/Early Historic Period. The proposed development sites are located to the east/south east of the zone of archaeological potential associated with Carrick-on-Shannon (Urban Archaeological Survey of Carrick-on-Shannon).

### **Neolithic to Iron Age**

It is evident that Neolithic man was active in this region in or about 5,000 BC by the survival of the megalithic structure (SMR no. LE031:004) in the townland of Ballynamony. It is considered that such megalithic structures functions include that of communal burial tombs. These tombs were constructed of large stones, with a central burial area. The tombs were then covered by a mound of earth or small stones.

There are several enclosures in this area examples include (LE031:002) in the townland of Lisnagat, and the enclosure in the townland of Rinnacurreen (LE031:072). The term enclosure refers to a monument in which an area, often circular or oval, is surrounded or enclosed by a physical barrier such as a bank, ditch, wall or combination of these, usually constructed for defensive purposes. Enclosures can date from any period from Neolithic to post medieval and may represent a simple defended paddock but may equally be the remains of a ringfort; an enclosed farmstead of any period between the early Iron Age (300 BC-AD400) to as late as the seventeenth century.

### **Anglo Norman Period**

The Anglo-Norman settlement of this area has its surface expression in the three earthwork sites, which lie in the townlands of Townparks (LE031-006), (LE031-099) and Ballynacleigh (LE031-042). The term earthwork usually refers to earthen structures, usually raised and occurring in a wide variety of shapes and sizes. The nature of these monuments is not apparent from their upstanding features or from cartographic evidence alone. Some may be natural hillocks or ridges modified for use.

### **Early Christian Period**

Ringforts are quite common in this area, with five in the Carrick-on-Shannon area. The ringforts close to the proposed developments include ({LE031-001, LE031-003, LE031-013, LE031-040, LE031-041}). Ringforts are the most widespread type of archaeological monument in the country with approximately 40,000 in total. They are the classical Early Christian settlement type. They consist of circular areas, defined by banks and external ditches, and usually contain dwelling houses and outbuildings for extended families.

Early ecclesiastical settlements were mainly, if not exclusively, within smaller or large circular or sub circular enclosures, which generally contained a number of characteristic elements or features. The most important of these, apart from the circular enclosure itself, would have been the church or oratory, a burial area, cross slabs, pillar stones and holy wells. Sites in the immediate area which fall into this category include in the townland of Attiroy there is a church site (LE031:039). This site consists of an enclosure and a bullaun stone. Bullaun is the Irish for a hollow in a stone and the exact function of such a stone is unclear. They are associated with early ecclesiastical sites and surviving tradition alludes to curative powers similar to holy wells.

#### **4.11.3.3 HISTORICAL BACKGROUND OF CARRICK-ON-SHANNON**

Although Carrick-on-Shannon may have always been a crossing point on the River Shannon, it did not exist as a town until the early 1600's, when it was fortified by the forces of the English government, and garrisoned so as to control the crossing of the Shannon and protect the colonists. The castle and lands of Carrick-on-Shannon were granted to Captain Maurice Griffith following the defeat and dispossession of Brian O'Rourke in 1603. They were re-granted to Sir Thomas Dutton in 1625 and later passed to the St. George family. In 1613, King James I granted the town a Royal Charter, by which it became a Royal Borough, with a Corporation, which consisted of a Provost, Burgesses and Commonalty.

Throughout the seventeenth and eighteenth centuries, Carrick-on-Shannon was exclusively a Protestant town, but Catholics were permitted to live in the "Liberty", on the Roscommon side of the river, outside the borough boundary. After King William ousted James II and the Penal Code took effect in 1698, no Catholic was allowed to live in Carrick-on-Shannon. In that year the Protestant place of worship was transferred from Kiltoghert to Carrick-on-Shannon.

Until the twentieth century the town remained relatively small with a human population of just 1,870 living in 321 houses. At this time, the streets were reported as badly paved and not lit.

The present Shannon bridge, built in 1846, replaced an 11 arch structure built in 1718. The jail was built between the years of 1815 to 1824. As the centre for the Leitrim County Grand Jury, Carrick-on-Shannon emerged as the administrative capital of county Leitrim, and this was continued with the establishment of Leitrim County Council in 1898.

Two significant developments in the mid-nineteenth century contributed greatly to the importance and growth of Carrick-on-Shannon – one was the great improvements of the Shannon Navigation in 1846, when the present bridge was constructed, while the other was the extension of the Midland Great Western Railway line from Mullingar to Sligo in 1862.

#### 4.11.3.3.1 Townland Names

Townland names are an important source of information as they reflect on the topography, land ownership and land use within an area, as well as its history, archaeological monuments and folklore. Where a monument has been forgotten or destroyed, a place name may still refer to it, and may indicate the possibility that the remains of certain sites may survive below the ground surface.

The Ordnance Survey surveyors wrote down the Townland names in the 1830's and 1840's, when the entire country was mapped for the first time. The mapmakers, soldiers and antiquarians who collected the place names and local history varied in their interests and abilities. While most place names were anglicised or translated

---

relatively accurately, some were corrupted virtually beyond recognition. Nonetheless, a variety of place names, whether of Irish, Viking, Anglo-Norman, English, or in very rare cases Anglo-Saxon, origin, appears throughout Ireland, and the appearance of the different languages is often a good indicator of the cultural heritage, and therefore the archaeological record of the area.

Here is a brief description of what the townlands in the area mean, it is taken from Rev. John Pinkmann's book "Placenames of County Leitrim".

- **Attifinlay** means "the site of Finlay's house".
- **Attirory** means "the site of Rory's house".
- **Ballynamony** means the "townland of the bog". There is a small fort, with two large upright stones said to be the marks of an ancient grave.
- **Ballynacleigh**, means "the townland of the stone".
- **Carrick-on-Shannon** means "the weir of the ridge of the marsh".
- **Correen** means "a small round hill", **Corr** and its diminutive **coirrin**, are used to denote a round hill, and sometimes a round hollow.
- **Drumkerran** means "ridge of the mountain ash or rowan tree". Much superstition was attached to the **caorthann** in olden times. Among other forms it was supposed to be a "terror" to the fairies. An ancient adage ran "Bring a quicken tree walking stick out at night and the fairies will give you a wide berth".
- **Lisnagat** means the "fort of the wild cats". Pinkamnn explains that "Wild cats were once very common in parts of the country – large, wicked, rough-looking creatures, nearly twice the size of the ordinary cat". They were very strong and active and at the time very dangerous. Many tales are told about their doings and stories of demon cats have found their way down to modern legend.
- **Rinnacurreen** means the "point of the little bog or marsh". This is a point of land, running into the River Shannon about two miles to the west of Jamestown. There is a small lake in the middle of the townland.
- **Townparks** means "hill of the sacks". Its ancient name was **Corbulloge**.
- **Lisseghan** means the "fort of the seat". This is the local interpretation of the name.

#### 4.11.3.3.2 Archaeological Sites in the Vicinity of the proposed Development

While none of the following sites and monuments listed in Table 4.1.1 will be directly affected by the development, they are included to highlight the specific archaeological resources of the area.

**Table 4.1.1 Archaeological Sites in the vicinity of the proposed development**

TOWNLAND	ARCHAEOLOGICAL SITE TYPE	SMR NUMBER	APPROXIMATE DISTANCE FROM ATTIRORY
<i>Lisnagat</i>	Ringfort	LE031-001	2.5 km
<i>Lisnagat</i>	Enclosure	LE031-002	2.5 km
<i>Ballynamony</i>	Ringfort conjoined	LE031-003	2.25 km
<i>Ballynamony</i>	Megalithic Structure Site	LE031-004	2.5 km
<i>Townparks</i>	Town	LE031-005	1.5 km
<i>Townparks</i>	Earthwork Site	LE031-006	1 km
<i>Correen</i>	Ringfort	LE031-013	1.25 km
<i>Attiroy</i>	Church Site	LE031-039	500 m
<i>Lisseeghan</i>	Ringfort	LE031-040	1.5 km
<i>Drumkerran</i>	Ringfort conjoined	LE031-0041	2 km
<i>Ballynacleigh</i>	Earthwork Site	LE031-042	1.75 km
<i>Rinnacurreen</i>	Enclosure	LE031-072	1.5 km
<i>Townparks</i>	Earthwork Site	LE031-099	2 km

The above sites are described in detail in Appendix 10 - Part A.

#### 4.11.3.3.3 Photographic and Cartographic Evidence

An aerial photograph of the site of the proposed development taken in 1984, is clearly visible but there are no archaeological features apparent. The 1836 OS six-inch map (first edition) of this area shows (see Appendix 10 - Part B) the townland of Attiroy and Townparks much as they are on the current edition. The 1945 OS six-inch map (third



edition) of this area (see Appendix 10 - Part C) is similar to that of the 1836 OS map (first edition). However, it identifies archaeological monuments which are not included in the 1836 map, such as a ringfort (LE031:001), earthwork site (LE031:042), a church site (LE031:039), and enclosure (LE031:072).

#### 4.11.3.4 SITE INSPECTION

No surface evidence of archaeological sites were observed during the site inspection.

The archaeological assessment of the proposed development site involved the examination of land in the townland of Attiroy. The site was inspected on the ground by field walking within the areas of the proposed development and its immediate environs. The proposed development was visited on the 23<sup>rd</sup> of May 2002 and the 24<sup>th</sup> of May 2002, this allowed the opportunity for first hand observation of the terrain, which can often result in the discovery of previously unrecorded sites and finds. The site visit involved a description of the type of land found in the area of the proposed site, and a detailed inspection for possible archaeological sites. The main type of land found in Attiroy, consists of wet, grassy land. To the south east it is bounded by a stream running north-south east-west, which enters the River Shannon. Ground observation was hampered across the vast majority of the site, as the land is overgrown with vegetation given the season (early summer). A number of photographs of the site were taken during the course of the walk over survey are included in (Appendix 10 - Part D).

In addition to the terrestrial examination of this site, Dúchas has requested an underwater archaeological assessment to be carried out. It has been agreed with Dúchas that this survey will be carried out as soon as the exact location of the new outfall pipe is known, so that a detailed survey can be carried out (although, there is a possibility that the DBO contractor may use the current outfall pipe and that no new pipe will be installed). Until this underwater assessment is complete, it is not possible to indicate the true archaeological importance of the river area.

#### 4.11.4 IMPACTS OF THE PROPOSED DEVELOPMENT

There are no recorded archaeological sites or monuments within the boundaries of the proposed development. However, the vicinity of the proposed development site is rich in archaeological activity, especially the church site in the townland of Attiroy (LE031:039), which lies approximately 500m from the Attiroy. The other known archaeological sites, and their relevant areas of interest, which are located in the vicinity of the area of the proposed development are listed in Appendix 10 - Part E (SMR extract). These sites, or their areas of interest, will not be affected by the development. In addition this development will not impact on the architectural heritage of this area.

The condition of both sites makes it impossible to say whether any archaeological remains were present, as both sites are very overgrown. The underwater archaeological survey may reveal artefacts or structures of archaeological importance. Until the underwater archaeological assessment is complete, it is impossible to indicate the true archaeological importance of this area.

#### 4.11.4 MEASURES TO MITIGATE ADVERSE IMPACTS

No known sites of archaeological potential and/or interest are located within the site boundaries of the proposed development areas. Accordingly, no other avoidance, remedial or reductive measures are suggested. However if the underwater archaeological assessment reveals artefacts of archaeological importance then additional mitigation measures may be necessary.

##### 4.11.5.1 MONITORING

It is proposed that all ground disturbance be monitored by an archaeologist, working under license from Dúchas, The Heritage Service. It is the policy of Dúchas, The Heritage Service that developments in excess of 1 hectare in size require licensed archaeological monitoring. No other mitigation measures are considered necessary or

are proposed.

The developer's attention is drawn, to the relevant section of the National Monuments legislation 1930-1994, (see Appendix 10 - Part F), which state that, in the event of the discovery of archaeological finds or remains, Dúchas and the National Museum of Ireland, should be notified immediately. The developers should make provision to allow for, and fund whatever archaeological work may be needed on the site if any remains are noted after topsoil removal. The developer's attention is also drawn to the architectural heritage legislation 1999, (see Appendix 10 - Part G).

#### 4.11.5 CONCLUSIONS/RECOMMENDATIONS

Research through the desk study and the site visit indicate that while the areas proposed for development contains no definite archaeological remains there is still a need for caution and vigilance during any major groundwork operations. Ground observation was hampered due to the vegetation present on site. There can be no sure knowledge as to what may lie beneath the ground and until such time as the testing and subsequent archaeological monitoring has taken place (see section 4.11.5.1), the full effects of the proposal cannot be stated with certainty. There is potential that structures or other archaeological features or material may be uncovered during excavation related to the construction of the proposed developments especially since:

- 1) the site is wet and may preserve organic remains; and
- 2) there is also a suggestion that the area was occupied in the prehistoric period.

In addition, until the underwater archaeological assessment is complete, it is impossible to indicate the true archaeological importance of this area. This development will not impact on the architectural heritage of this area.

#### 4.11.7 NON TECHNICAL SUMMARY

The Archaeological and Historical Assessment was prepared by means of a desk study and field inspection.

Studies indicate that the areas proposed for development contains no definite archaeological remains, however the archaeological assessment of the proposed developments revealed a number of archaeological sites within the environs of the proposed developments. It highlighted that the most common monument types in the Carrick-on-Shannon area are ringforts and earthwork sites. The closest site identified to the Attiroy site is a Church site (LE031:039), which is located 500m south east of the proposed development. The proposed developments will have no impact on these sites. In addition the proposed development will have no impact on the architectural heritage of this area.

##### **Monitoring & Legislation**

There is potential that structures or other archaeological features or material may be uncovered during excavation related to the construction of the proposed developments especially since the both sites are wet and may preserve organic remains and there is also a suggestion that the area was occupied in the prehistoric period. However until the underwater archaeological assessment is complete, it is impossible to indicate the true archaeological importance of this area.

In the case of all major developments that involve a significant disturbance of ground level, it is required, in accordance with national policy, that excavations during construction be monitored by a suitably qualified archaeologist under licence from Duchas, The Heritage Service.

## 4.12 INTERACTION OF ENVIRONMENTAL EFFECTS, & SUMMARY OF MITIGATION MEASURES

### 4.12.1 SUMMARY OF ENVIRONMENTAL INTERACTIONS

The interaction of environmental effects are briefly summarised in Table 4.12.1 below. The interactions of environmental effects are detailed in Section 4.12.2. The Table below highlights the causes of the environmental impacts and indicates where these impacts interact with other areas of the environment (i.e., it highlights the cause and effects of impacts). The interactions are colour coded to highlight positive, neutral and negative interactions. The interactions, below, do not take into account the mitigation measures detailed in section 4.12.2.

**Table 4.12.1 Matrix showing Interaction of Environmental Effects**

CAUSE	EFFECT									
	Population	Economy	Ecology	Soil/ Hydrogeology	Geology/ Water Quality	Climate	Landscape	Road Infrastructure	Cultural Heritage	
Physical Development	X	X	X		X	X	X	X	X	
Population		X								
Soil Improvement					X				X	
Water Quality			X							
Noise	X									
Dust	X									
Odour	X									
Road traffic	X									

**Legend**

Colour	Interaction
X	Positive
X	Neutral
X	Negative

---

#### 4.12.2 INTERACTION OF ENVIRONMENTAL EFFECTS AND SUMMARY OF MITIGATION MEASURES

The environmental interaction, impacts and mitigation measures on the proposed development are discussed below. The main impacts affect: ecology; landscape (visual impact); and road infrastructure. Archaeology may be *potentially* impacted. Mitigation measures have been detailed to prevent/reduce impacts from occurring.

##### 4.12.2.1 HUMAN BEINGS: SOCIO ECONOMIC

The proposed expansion of the sewage treatment facility will have a net positive impact on socio-economics of Carrick-on-Shannon. In this regard, there are no direct mitigation measures which are necessary outside of:

- the monitoring of public service provision; and
- the implementation of proper development control so as to ensure the progressive and sustainable growth of the town which will be facilitated by the proposed development.

##### 4.12.2.2 ECOLOGY: FLORA & FAUNA

A positive impact arising from the proposed development would be an improvement in water quality of the River Shannon. A certain percentage of habitats will be removed during the construction of the proposed development. The layout has not as yet been finalised so the full impact of the development cannot be assessed. However the following mitigation measures will reduce the impacts that may occur:

- hedge cover is not to be removed or cut between the 1<sup>st</sup> of March and the 31<sup>st</sup> of August.
- Fencing will be erected to protect the remaining trees, root structure and associated habitats during the construction and operation phases.
- Planting of native tree species will be actively encouraged in order to screen the development and increase the habitat cover.

- 
- Care will be taken during the construction phase to ensure no silting or damage to the stream occurs.
  - The riparian woodland and reed and large sedge habitats will remain untouched, in so far as possible.

#### 4.12.2.3 SOIL: GEOLOGY & HYDROGEOLOGY

The proposed development will not involve direct discharging of effluent to ground nor will it involve substantial excavation of soils and rock. There is no direct impact envisaged on the geology or hydrogeology of the area. Any soil excavated as part of this development will either be: used as fill material on site; re-used off-site; or used as capping material at Carrick-on-Shannon landfill site. Accidental spills/leakages may impact, however, on the quality of soil, groundwater and/or surface water.

- A suitably designed oil/grit interceptor should be installed to prevent potentially contaminated surface runoff from reaching the River Shannon.

#### 4.12.2.4 WATER

The requirement for additional treatment, phosphate removal, was considered in relation to the existing water quality of the River Shannon and the nutrient loading status of the Upper Shannon catchment. On the basis of required water quality improvements and nutrient reductions it is recommended that nutrient reduction facilities are provided at the upgraded treatment plant. This will achieve water quality improvements in line with the Phosphorus Regulations towards implementing the Water Framework Directive.

- Between 1996 and 1999, the average recorded final effluent Total Phosphorous was 2.1 mg/l. The final effluent design standard for Total Phosphorous from the upgraded treatment works is 0.92 mg/l P. In low flow conditions, while this will have the effect of doubling the phosphorous load in the River Shannon, the concentration still remains in line with the Phosphorous Regulations.

- The final effluent design standard for BOD from the upgraded treatment works is 25 mg/l.
- The final effluent design standard for Suspended Solids from the upgraded treatment works is 35 mg/l.
- The final effluent design standard for Nitrate from the upgraded treatment works is 15 mg/l.

#### 4.12.2.5 AIR: NOISE

The primary noise emissions associated with the operation of the extended waste treatment works will be those associated with the operation of the aeration system. At this stage, the design of this facility has not been decided upon. However, if a similar design (surface air aeration) to the existing one is incorporated, then the noise levels will be increased by no more than 3 dB(A), which is barely perceptible. If a new design incorporated, a diffused air aeration system, then the noise emission from the oxidation system will be reduced by at least 10 dB(A).

The mitigation measures, specified below, will ensure that the operation of the wastewater treatment works will have a negligible to marginal noise impact at the nearest residences.

- All construction will be carried out in accordance with BS 5228: Part 1: 1997 Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery. Where possible the contractor will be instructed to use the least noisy equipment. With efficient use of well maintained mobile equipment considerably lower maximum noise levels (3-6 dB(A)) than those predicted can be attained. The Project Engineer will closely supervise all construction activity. Construction activity due to its nature is a temporary activity and thus any impacts will be short term. All construction works will be carried out during the day-time period.;
- If the existing oxidation ditch system is replaced by a diffused air aeration system then the blowers / compressors will be contained in a housing envelope (pumping station) giving a sound transmission loss in the region of 40 dB(A);



- 
- All doors should be kept closed during the operation of the plant;
  - There will be no night-time tonal or impulsive components contained in the noise emission at any residence.
  - No significant tones or impulsive components should be audible from the works at any residence. The potential temporary noise impact associated with construction will be short term. There will be a negligible road traffic noise impact associated with all components of the works operation.

#### 4.12.2.6 AIR: DUST

At present, there is no adverse effects arising from dust deposition from the existing plant. With the implementation of the mitigation measures below, no adverse effects are expected as a result of the proposed development.

- All embankments and soil stockpiles created as part of the proposed development should be vegetated immediately, to anchor the soil and reduce the surface area open to the environment.
- If periods of dry weather occur during construction, spraying of the access routes and other exposed areas should be undertaken to help reduce dust emissions.
- Access routes should be regularly inspected and cleaned when necessary.
- A complaints register should also be maintained on-site and should any complaints relating to dust emissions be submitted, then these shall be immediately dealt with.

#### 4.12.2.7 AIR: ODOUR

There are no measures in place to mitigate the odorous emissions from the current works. It is not possible to comment on mitigation methods from any proposed works until the final scheme is chosen.

The emission from the current works is approximately 11000 ou<sub>E</sub>/m<sup>3</sup>. The odour footprint resulting from this emission is unlikely to impact upon any existing residential properties at levels exceeding those which *may* cause annoyance (represented by C<sub>98 1-hour</sub> 5 ou<sub>E</sub>/m<sup>3</sup>).

At the current works, some odour may however be perceived at the marina to the west of the works at levels greater than those which *may* cause annoyance (C<sub>98 1-hour</sub> 5 ou<sub>E</sub>/m<sup>3</sup>) and those *likely* to cause annoyance (C<sub>98 1-hour</sub> 10 ou<sub>E</sub>/m<sup>3</sup>). There is no exceedence of the level *likely* to cause annoyance (C<sub>98 1-hour</sub> 10 ou<sub>E</sub>/m<sup>3</sup>) at any identified receptor locations.

- It is suggested that as a minimum, the new works should be designed with the aim of not exceeding C<sub>98 1-hour</sub> 5 ou<sub>E</sub>/m<sup>3</sup> at the boundary of the extended wastewater treatment works site.

#### 4.12.2.8 CLIMATE

The proposed development is not expected to have any impacts on the climate of the surrounding area either during its construction or subsequent operation.

#### 4.12.2.9 LANDSCAPE

The proposed site lies southeast of the town adjacent to the existing wastewater treatment works. The site slopes towards the existing works and the river but is well screened by adjoining and nearby vegetation. There are localised views into the site from its immediate surroundings, principally open views from adjoining minor roads

and partial views from nearby residential property, but no medium or long distance views. There are no views from the river or nearby marina. The most sensitive receptors are nearby houses, where potential impacts may be moderately negative during construction, reducing to slightly negative during operation.

Mitigation against potentially negative impacts on landscape and visual amenity will be addressed in the detailed design of the proposals and include:

- optimising site layout to minimise visual intrusion;
- retaining existing vegetation as far as practical;
- careful selection of colour for external finishes;
- earth banks and screen planting where appropriate.
- At the waste water treatment plant site, building structures (not including hand railings or other minor plant elements) may extend to approximately 2.0 metres above ground level on the existing higher ground and approximately 4.0 metres on the existing lower ground adjoining the current WWTW with minimal impacts upon the surrounding landscape.

#### 4.12.2.10 MATERIAL ASSETS – ROAD INFRASTRUCTURE

A daily average of 6,876 vehicles are encountered on the N4. A recent traffic survey along the local tertiary road from Attifinlay – Attiroy shows 18 vehicles over a 12-hour period. Impacts on this road leading to the wastewater treatment works during the construction and operational phase of this project will cause a deterioration of this road. This can be mitigated by:

- Upgrading this road to the wastewater treatment works.

#### 4.12.2.11 MATERIAL ASSETS – CULTURAL HERITAGE

This development will not impact on the architectural heritage of this area.

Research through the desk study and the site visit indicate that while the areas proposed for development contains no definite archaeological remains there is still a need for caution and vigilance during any major groundwork operations. Ground observation was hampered due to the vegetation present on site. There can be no sure knowledge as to what may lie beneath the ground and until such time as the testing and subsequent archaeological monitoring has taken place, the full effects of the proposal cannot be stated with certainty. There is potential that structures or other archaeological features or material may be uncovered during excavation related to the construction of the proposed developments especially since 1) the site is wet and may preserve organic remains; and 2) there is also a suggestion that the area was occupied in the prehistoric period. In addition, until the underwater archaeological assessment is complete, it is impossible to indicate the true archaeological importance of this area.

Based on the above, the following mitigation measures will be taken:

- excavations during construction will be monitored by a suitably qualified archaeologist under licence from Dúchas, The Heritage Service.
- an underwater archaeological assessment will be carried out by a suitably qualified archaeologist under licence from Dúchas, The Heritage Service.

#### 4.12.2.12 CUMULATIVE ENVIRONMENTAL EFFECTS

The effects to the general environment are positive with improvement in water quality due to stringent final effluent standards. Currently, water quality is being impaired by frequent discharges of stormwater overflows to the River Shannon at six locations throughout the town, as well as at the existing wastewater treatment works which is becoming increasingly overloaded. An improvement in the existing noise levels will also be observed should the DBO contractor cease to use the oxidation ditch.

---

Socio-economically, the expansion of the WWTW will result in a positive impact as residential and commercial expansion and development can continue to increase. Phosphorous levels, and water quality in general, is set to improve by the upgrading of the existing treatment works. This will ultimately improve the River Shannon as a recreational area which will positively affect water based sports, cruising and fishing etc. and ultimately tourism in general.

#### **4.12.3 IMPACTS IN THE EVENT OF BREAKDOWN OF EQUIPMENT ("WORSE CASE")**

In the event of breakdown of equipment on the WWTW, the following negative impacts (which are not considered irreversible or life threatening) could arise:

- Assuming failure of odour scrubbing equipment, exposure to odorous emissions could become an issue for a normal population.
- Failure in electrical supply to the WWTW would arise in operation of a standby generator which may give rise to temporary increase in noise levels. An acoustic cover will be supplied to attenuate noise.
- Failure of the generator to operate, when electrical supply is cut off, would result in sewage passing into the River with minimal treatment.
- Failure of pumps in pumping stations would cause sewage to overflow from the pumping stations causing health and safety risks, odour problems, and risks of contaminating the River Shannon. The proposed new pumping station at Attifinlay will have a storm water holding tank which will store 200 m<sup>3</sup>.
- Leaks of fuels or chemical from equipment of storage facilities would cause odour problems as well as contamination of groundwater and surface water.

These risks are summarised in Table 4.12.2 below:

**Table 4.12.2 Risk assessment of worse case scenario**

Area	Failure of:	Risk summary	Probability	Impact	Risk Rating
Mechanical	Failure of odour scrubbing equipment	Odorous emissions could become an issue for normal residential population if site adjacent to WWTW is developed.	Low probability assuming proper maintenance.	Low	Low
Electrical	Failure of electrical supply at the WWTW	Failure of pumps giving rise to sewage passing into the river with primary treatment (settlement) only.	Medium probability of an interruption of electrical supply. A standby generator will be in place.	Medium	Medium
Mechanical/ Electrical	Failure of electrical supply AND failure of generator to operate	Sewage will pass into the river with primary treatment (settlement) only.	Low probability assuming the generator is well maintained.	Medium	Low
Mechanical/ Electrical	Failure of pumps in pumping stations	Sewage overflowing from the pumping stations causing health and safety problems, odour problems and risks of pollution to River Shannon.	Low probability assuming pumps are well maintained.	High	Medium
Human Error	Leaks of fuels or chemicals	Potential for pollution of groundwater and surface water as well as odour problems.	Low probability assuming correct storage of chemicals.	High	Medium

**Legend**

Colour	Rating
	Low
	Medium
	High

---

#### 4.12.4 INVESTMENT OF MITIGATION MEASURES

In the event of mass failure of equipment, an Emergency Plan should be put into operation. A list of emergency contact numbers should be clearly visible at the site office. Contact numbers should include:

- Water abstractors: Masonite; Longford, Roscommon, and Westmeath County Councils
- Shannon Fisheries Bord;
- ESB (as they regulate the flow at Lough Allen);
- Inland Waterways.

Investment into Health and Safety issues, as discussed in Section 3.4.4 and 3.5.2., is vital. Adequate storage facilities for chemicals and fuels including adequate bunds will mitigate runoff of spillages and leakages.

The EIS has taken account of the potential environmental impacts and has detailed mitigation measures for same. These have been highlighted in the above sections in 4.11 and are summarised again in Chapter 5.

Adoption of good management practices on site during construction and operation phase, coupled with the above environmental mitigation measures, will ensure mitigate against adverse impacts.

## 5 DESIGN STANDARDS

The following design standards and environmental conditions will be set for the proposed extension of the wastewater treatment site based on the baseline specialist studies carried out as part of this investigation:

**Table 5.1 Design standards and Environmental conditions at the WWTW site**

Category	Description of design standards
<b>Ecology</b>	Hedge cover is not to be removed or cut between the 1 <sup>st</sup> of March and the 31 <sup>st</sup> of August during the breeding season (to protect wildlife).
	Erect fencing to protect the remaining trees, root structure & drainage system, and associated habitats during the construction and operation phases.
	Plant native tree species in order to screen the development and increase the habitat cover.
	Ensure no silting or damage to the stream occurs.
	The riparian woodland and reed and large sedge habitats should remain untouched, in so far as possible.
<b>Soil</b>	Install a suitably designed oil/grit interceptor to prevent surface runoff from reaching groundwater and/or the River Shannon. Silt traps and bunding shall be constructed where runoff from earthworks might potentially flow into the adjacent stream or River Shannon.
<b>Water</b>	The final effluent design standard for Total Phosphorous from the upgraded treatment works is 0.92 mg/l P.
	The final effluent design standard for BOD from the upgraded treatment works is 25 mg/l.
	The final effluent design standard for Suspended Solids from the upgraded treatment works is 35 mg/l.
	The final effluent design standard for Nitrate from the upgraded treatment works is 15 mg/l.



Category	Description of design standards
<b>Noise</b>	All construction will be carried out in accordance with BS 5228: Part 1: 1997. Avoid unnecessary revving of machinery. Use least noisy equipment where possible. All construction works to be carried out during the day-time period.
	If the existing oxidation ditch system is replaced by a diffused air aeration system then the airblowers / compressors will be contained in a housing envelope.
	All doors should be kept closed during the operation of the plant: self closing mechanisms to be installed.
	There will be no night-time tonal or impulsive components contained in the noise emission at any residence.
	The total noise (accumulative noise from all sources on site) measured at any sensitive locations during the operation of the WWTW should be kept below an hourly Leq of 40 dB(A) at night-time (22:00 to 08:00) and an hourly Leq of 55 dB(A) during day-time (08:00 to 22:00).
	No significant tones or impulsive components should be audible from the works at any residence.
<b>Dust</b>	All embankments and soil stockpiles created as part of the proposed development should be vegetated immediately, to anchor the soil and reduce the surface area open to the environment.
	If periods of dry weather occur during construction, spraying of the access routes and other exposed areas should be undertaken to help reduce dust emissions.
	Access routes should be regularly inspected and cleaned when necessary.
	A complaints register should also be maintained on-site and should any complaints relating to dust emissions be submitted, then these shall be immediately dealt with.
<b>Odour</b>	It is suggested that as a minimum, the new works should be designed with the aim of not exceeding $C_{98\ 1\text{-hour}} 5\text{ ou}_E/\text{m}^3$ at the boundary of the extended wastewater treatment works site.

<b>Category</b>	<b>Description of design standards</b>
<b>Landscape</b>	Optimise site layout to minimise visual intrusion;
	Retain existing vegetation as far as practical;
	Select colour carefully for external finishes;
	Create earth banks and screen planting where appropriate.
	At the waste water treatment plant site, structures may extend to 2.0 metres above ground level on higher ground and 4.0 metres on lower ground adjoining the existing plant.
<b>Road Infrastructure</b>	Re-strengthen the road to the wastewater treatment works following construction of WWTW.
<b>Cultural Heritage</b>	Monitor excavations during construction. This to be carried out by a suitably qualified archaeologist under licence from Dúchas.
	Once the location of a new outfall pipe has been decided, an underwater archaeological assessment will be carried out by a suitably qualified archaeologist under licence from Dúchas, The Heritage Service.

Using these design standards and recommendations, the proposed WWTW will be designed using Best Available Techniques (BAT).

The following comments have also been received from the Fisheries Board (see letter in Appendix 1). Where appropriate, these have been examined in the EIS:

The developers shall:

- 1) not cause obstruction to angling;
- 2) assess fish stocks prior to construction;
- 3) implement Urban Wastewater Treatment Regulations and Lough Derg/Ree Plan;
- 4) Q4 water quality status to be maintained;
- 5) assess plant to ensure it is working sufficiently before 2020 so allow for further expansion before 2020;
- 6) submit to the Board measures to treat stormwater;
- 7) collect site drainage in ponds and use control measures to isolate pollutants;
- 8) grit/oil interceptors at drainage channels;
- 9) maintain the above installations;
- 10) prevent construction site runoff from entering River Shannon;

- 11) mixer washing/concrete shall not be discharged to River;
- 12) refuel equipment 50 m or more from river;
- 13) clean equipment 50 m or more from river;
- 14) no hydrocarbons shall discharge to water – ensure that there is adequate means on site to absorb or contain any spillages.

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

---

## BIBLIOGRAPHY

### Miscellaneous

An Foras Forbatha (May 1985). *Upper Shannon Water Quality Management Plan*.  
Volume 2.

DOELG (July 1999). "Lough Derg and Lough Ree Catchment Monitoring and  
Management System".

DAFF (July 1996). "Code of Good Practice to Protect Waters from Pollution by  
Nitrates".

EPA (2002). *Guidelines on the information to be contained in Environmental Impact  
Statements*.

Leitrim County Council (January 2002). *Sludge management plan for County Leitrim*.

MBNA (August 2002) *pers comm* re employment.

Ordnance Survey 1:50,000 Discovery Series map (no. 33)

Ordnance Survey 1:10,560 map

P.J. Tobin (2002). *Carrick-on-Shannon Sewerage Improvement Scheme Volume 1  
Preliminary Report*.

### Legislation

Environmental Protection Agency Act (1992)

Environmental Protection Agency Act (1992) Noise Regulations (SI 179 of 1994).

European Communities (Environmental Impact Assessment) (Amendment)  
Regulations 1999 (S.I. No. 93 of 1999)

EC Directive 2000/60/EC establishing a framework for Community action in the field of water policy (Water Framework Directive)

Local Government (Water Pollution) Act (1977)

Planning and Development Regulations (S.I. No. 600 of 2001)

Safety, Health and Welfare at Work Act, 1989;

Safety, Health and Welfare (General Applications) Regulations (SI 44 of 1993)

Safety, Health and Welfare (Construction) Regulations 2001

Urban Waste Water Treatment Regulations (S.I. No. 254 of 2001)

Water Quality Standards for Phosphorus Regulations (S.I. No. 258 of 1998)

### **Development Plans**

Carrick-on-Shannon Town Development Plan 1997-2002 (incorporating subsequent amendments)

Leitrim County Development Plan 1997-2002

Roscommon County Development Plan (in respect of Cortober)

### **Human Beings**

Census of Population, 1991 1996, and 2002. Central Statistics Office.

Live Register Statistics (2001 and 2002)

Quarterly National Household Survey (First Quarter 2002)

[www.gov.ie/arts-sport-tourism](http://www.gov.ie/arts-sport-tourism)

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

---

## Ecology

Duchás The Heritage Service's Environmental Designation database.

EPA Biological Assessment of Water Quality (Q-values)

EPA (1998 – 2000). *Report on Water Quality in Ireland.*

Fossit (2000). *A Guide to Habitats in Ireland.*

Wildlife (Amended) Act (2000)

## Soil: Geology and Hydrogeology

DOELG, EPA and GSI (1999) *Groundwater Protection Schemes.*

Geological Survey of Ireland (1996). *Geology of Leitrim. 1:100,000 series*

Geological Survey of Ireland. (2002) *Aquifer Classification (Pers comm).*

Ordnance Survey maps 1:10,560 and 1:50,000

Site investigation report by Irish Drilling (2002)

## Water

Bowman J J et al (1996) *Water Quality in Ireland 1991-1994.* EPA, Wexford.

Bowman J J (1998) *River Shannon Lake Water Quality Monitoring 1995 to 1997.*  
EPA, Wexford.

Bowman J J (2000) *River Shannon Lake Water Quality Monitoring 1998 and 1999.*  
EPA, Wexford.

Department of Environment and Local Government (1997) *Managing Ireland's Rivers and Lakes: A catchment-based Strategy against Eutrophication.* Department of Environment and Local Government.

---

Department of Environment and Local Government (1998). *Statutory Instruments S.I. No. 258 of 1998. Local Government (Water Pollution) Act 1977. (Water Quality Standards for Phosphorus) Regulations, 1998.*

Department of the Environment and Local Government (2001). *Statutory Instruments S.I. No. 254 of 2001. Urban Water Quality Treatment Regulations 2001.*

Environmental Protection Agency (1996). *The EPA Act 1992, (Urban Waste Water Treatment Plant) Regulations, 1994. A Handbook on implementation for Sanitary Authorities.* ISBN 1-899965-04-1.

Environmental Protection Agency. *The Biological Survey of River Quality. Results of the 1996 investigations.* ISBN 1-899965-54-8.

Environmental Protection Agency (2000). *The Biological Survey of River Quality. Results of the 1999 investigations.* ISBN 1-84095-023-4

Environmental Protection Agency (2000). *Ireland's Environment – A Millennium Report.* EPA, Wexford.

EPA Urban Waste Water Discharge in Ireland. *A report for the years 1996-1997.* ISBN 1-849965-76-9. O'Leary et al.

EPA Urban Waste Water Discharge in Ireland. *A report for the years 1998-1999.* ISBN 1-84095-047-1. O'Leary et al.

European Union (2000). *Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for communication in the field of water policy (Framework Directive).*

European Union 1991. *Directive 91/271/EEC of the European Parliament and of the Council concerning urban waste water treatment.*

Kirk McClure Morton (1998) *Lough Derg & Lough Ree Catchment Monitoring and Management System, Interim Report.*

Kirk McClure Morton (1999) *Lough Derg & Lough Ree Catchment Monitoring and Management System, Management Proposals Report.*



---

Kirk McClure Morton (2001). *Lough Derg and Lough Ree Monitoring and Management System – Main Report*

Lucey J et al (1999) *Water Quality in Ireland 1995-1997*. EPA, Wexford ISBN 1-899965-97-1.

NEUT 99/3/1 (1999) *Harmonised Reporting Procedures for Nutrients (HARP)* OSPAR Publication London.

### Noise

BS 5228: Part 1: 1997 (Noise Control on Construction and Open Sites - Part 1. *Code of Practice for Basic Information and Procedures for Noise Control*).

EPA (1995). *Guidance Note For Noise In Relation to Scheduled Activities*.

### Dust

German Engineering Institute VDI 2119 document *Measurement of Dustfall Using the Bergerhoff Instrument (Standard Method)*.

German Technical Instructions on Air Quality Control – (TA Luft) Guideline

### Odour

CEN prEN 13725 (2001). *Air quality - Determination of odour concentration by dynamic olfactometry*, CEN/TC264/WG2 'Odours'.

Complex-1 atmospheric dispersion model.

Yang, G & Hobson, J (1997) *Odour Emission from Sewage Treatment Works III* .  
WRc, Swindon

---

## Climate

Met Éireann. Rainfall data (1991 to 2000).

Met Éireann. Wind speed and Wind direction data (1970 to 1999).

## Landscape

Environmental Protection Agency (1995). *Advice Notes on Current Practice in the preparation of Environmental Impact Statements*.

## Road Infrastructure

NRA (2001). Traffic Survey at Carrick-on-Shannon along the N4.

## Cultural Heritage

An Foras Forbatha Teoranta (1975). "Monuments of Archaeological Interest in County Leitrim". Unpublished.

Bennett, I. (Ed.) (1996-1997). *Excavations*. Wordwell. Dublin.

Carrick-on-Shannon and District Historical Society (CSDHS) (1998). *Carrick-on-Shannon Remembered, Aspect of History, Print and Pictorial Vol. 1*. CSDHS. Carrick-on-Shannon.

Department of Arts, Heritage & the Islands (1999). *Framework and Principles for the Protection of the Archaeological Heritage*. Government Publications, Dublin.

Donovan and Others (1837) *Ordnance Survey Letters*.

Donovan and Others (1837). "Ordnance Survey Namebooks".

"General Valuation of Rateable Property in Ireland" County of Leitrim (1851).

---

Griffith Richard (1851). "*General Valuation of Rateable Property in Ireland*" county of Kildare.

Killanin, Lord & Duignan, M. (1962). *The Shell Guide to Ireland*. Edbury Press, London.

Office of Public Works (1939). *Sites and Monuments Records for County Leitrim*,

Pinkmann, Rev. John. "Placenames of County Leitrim".

The Heritage Council (2000). *Archaeology and Development: Guidelines for good practice for developers*. The Heritage Council of Ireland. Dublin.

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

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