

APPENDIX 4

Terrestrial Ecological Assessment (Pipeline Route)

[Biosphere Environmental Services, 2005]

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**DERRINUMEERA SLUDGE HUB CENTRE,
PIPELINE ROUTE TO NEWPORT**

**TERRESTRIAL
ECOLOGICAL ASSESSMENT**

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NON-TECHNICAL SUMMARY

Baseline Environment

A proposed pipeline route from Derrinumeera Landfill to Newport Harbour was surveyed for habitats and associated flora and fauna interests. The study corridor is mostly through low quality agricultural land, with developed land predominating towards Newport town. The Newport River, a fine example of a lowland river (FW2), is a main feature of the area. Wet heath (HH3), mostly well grazed, occurs frequently alongside the road in the eastern sector. Other principal habitats are wet grassland (GS4) and improved agricultural grassland (GA1). Field boundaries are usually stone walls (BL1) or fencelines, with hedgerows (WL1) notably scarce. Several small lakes (FL) occur close to the existing road. Semi-natural woodland (WN) and scrub (WS1) occur alongside the Newport River. Conifer plantations (WD4) occur at Derrinumeera. Road verges are often disturbed ground and can be accommodated in the category recolonising bare ground (ED3).

The principal natural or semi-natural habitat of conservation importance in the study area is the Newport River, including the associated bankside vegetation. Elsewhere, the habitats have low or negligible conservation value though the various small lakes are of local interest. There are no known rare or scarce plants in the survey area.

The Newport River supports otter and kingfisher, species listed on Annex II of the Habitats Directive and Annex I of the Birds Directive respectively. Otherwise, the various fauna species which occur in the survey corridor are common species of the countryside and none is threatened or of particular conservation importance.

Two candidate Special Areas of Conservation, designated under the EU Habitats Directive, are relevant to the study area, the Newport River cSAC (code 02144) and Clew Bay cSAC (code 01483).

Predicted Ecological Impacts by Proposed Development

The principal impact by the scheme will be habitat disturbance due to trench excavation. However, practically the entire route is along existing roads where the pipe will run within the hardcore or in the associated verges. Between Derrinumeera and the Newport River, the road verges comprise hard core, grass or disturbed ground. Apart from a short length of hedgerow at Cloonsehil, there are no hedgerows or treelines of note. The lands adjacent to the road, should it be required for working wayleaves, is predominantly wet or improved grassland and remnant heath. None of these habitats are of significant conservation value and disturbance by the development is rated as an impact of Minor significance. The various lakes to the south of the R311 would not be directly affected, though precautions would need to be taken during construction to prevent run-off.

The section of the route which runs alongside the Newport River could involve the removal of some of the woodland/scrub which skirts the river in the section east of the bridge crossing point. Removal of trees and shrubs here could be detrimental to the

ecology of the river. Depending on how much tree/shrub removal would be required, this potential impact would be rated between Moderate and Major significance. If, however, the line is laid on the southern side of the road, disturbance of the grass bank and hedgerow there would only be rated as of Minor significance. In the section west of the bridge crossing point, the route is likely to have less, if any, of a potential impact on the Newport River, as for much of the length there is ample hardcore areas associated with the existing developed areas. However, disturbance to the trees/shrubs and associated mill race channel along the north side of the road, opposite the disused mill building, would be of Minor to Moderate significance.

The various species of fauna which occur along the pipe route would be largely unaffected by the scheme and all will continue to occur in the immediate vicinity. As the pipeline is unlikely to have any direct impacts on the Newport River, it is considered that the otter and kingfisher populations would not be adversely affected. However, a significant pollution incident during construction could affect the food supplies of these important species. The road bridge which crosses the Newport River could support roosting bats. Should the scheme involve any direct interference with the stonework of this bridge, then roosting bats, if present, could be affected.

The proposed scheme is likely to pass through the Newport River cSAC site, at least in the vicinity of the bridge crossing. There is a possibility that some disturbance, by way of tree and scrub removal, could be caused to the section of river east of the bridge crossing. The significance of this would depend on the amount of vegetation removed but this could be a significant impact. Any pollution incident during construction works could have adverse impacts on the principal species of conservation importance associated with the river, namely otter and kingfisher. The proposed development is not anticipated to have any impacts on the Clew Bay cSAC.

Mitigation Measures

Mitigation measures relating to the following are outlined:

- Avoidance of habitats
- Reinstatement of trees and shrubs
- Fauna (inc. riparian animals, bats, nesting birds)

Likely Significant Impacts After Mitigation Measures

Providing mitigation measures as outlined are followed, impacts on terrestrial ecology due to the proposed scheme are rated mainly as from Negligible to Minor. Should it be necessary to remove vegetation from along the bank of the Newport River, the impact is rated as potentially of Moderate to Major significance. All fauna species are expected to continue to occur in the area after the construction is complete. The mitigation measures outlined in the report if fully implemented will ensure compliance by the local authority with the various National and EU legislation relating to habitats and species.

1.0 INTRODUCTION

As part of the investigations for the proposed pipeline route between Derrinumeera Landfill and Newport Harbour, Biosphere Environmental Services was commissioned to carry out a survey of the terrestrial ecological interests¹ along the route of the pipeline. The objectives of the work were as follows :

- To provide baseline data on habitats, flora and fauna by way of field survey and desk review
- To assess potential impacts of the proposed development on habitats, flora and fauna
- To recommend mitigation measures as considered necessary

The study area extends from the existing landfill site at Derrinumeera to Newport harbour, a distance of approximately 6 km from east to west. The pipeline will follow the existing road for practically the entire route, with part of it skirting the Newport River.

The approach to the study follows the 'Guidelines on the information to be contained in Environmental Impact Statements' by the EPA (2002).

1.1 Designated sites for conservation in survey area

Two candidate Special Areas of Conservation, designated under the EU Habitats Directive (Council Directive 92/43/EEC), are relevant to the study area:

- The Newport River cSAC (code 02144) is an important site for the pearl mussel *Margaritifera margaritifera* and the Atlantic salmon *Salmo salar*, species that are listed on Annex II of the EU Habitats Directive. Other important species such as otter *Lutra lutra* and kingfisher *Alcedo atthis* also occur. The site includes all of the river channel upriver of the old railway bridge in Newport but the extent of adjoining terrestrial habitat that is included within the site is currently under review (M. Dromey NPWS pers. comm.). For details for this site see NPWS site synopsis in Appendix 1.
- Clew Bay cSAC (code 01482) is of importance for a suite of habitats and species listed on Annex I and Annex II respectively of the Directive. The site includes all of the estuarine habitat in Newport Bay, extending to the road bridge in the town.

¹ Aquatic interests are assessed in a separate report

2.0 SURVEY METHODOLOGY

A field survey of the pipe route was carried out in early March 2005. Practically the entire route was covered by foot. The width of the survey corridor varied, being up to 50 m to either side of the central line in the less developed sections.

During the survey, habitats, plant species and vegetation types present were recorded using an (enlarged) Ordnance Survey 1:10,560 scale map (drawing no. 1908-2411). Habitat classification is according to the system recommended by The Heritage Council (Fossitt 2000). Notes were made on bird species present along the survey corridor. For mammals, the main emphasis was on search for signs of activity or dwellings, such as setts of badgers. Particular attention was given to the possible presence of habitats and/or species which are legally protected under Irish or European legislation (especially the Flora Protection Order 1999; Wildlife Act 1976; Wildlife (Amendment) Act 2000; EU Habitats Directive; EU Birds Directive).

The standard literature was checked for references to the site and locality, as were the listings and maps of sites of conservation importance in County Mayo held by the National Parks and Wildlife section of the Department of the Environment, Heritage and Local Government. Ms Marie Dromey of NPWS (Dublin) kindly provided information on the Newport River cSAC site.

2.1 Survey limitations

The survey was carried out in early spring, a period when principal habitats are readily identified based on perennial species, early growing species and physical characters. As no terrestrial habitats of high conservation value were identified, further survey in summer is not considered necessary. Apart from bats, most mammals are active in winter and their signs could be easily found due to low vegetation cover. Both resident bird species and winter migrants were present at time of survey. While a survey for nesting birds was not conducted, this is not considered a significant limitation as no species of conservation importance (other than kingfisher) would be expected to occur within the survey area due to the types of habitat present.

Overall, no significant difficulties were encountered in compiling information on the flora and fauna of the study area.

3.0 BASELINE ENVIRONMENT

3.1 Ecological overview of study area

The study corridor is mostly through low quality agricultural land, with developed land predominating towards Newport town. The topography of the area is low-lying hills, with a rise from west to east to over 100 m at Derrinumeera.

The Newport River, a fine example of a **lowland river (FW2)**, drains the western sector of the study area, whilst the eastern sector drains southwards towards the Rossow and Owennabrockagh rivers. **Wet heath (HH3)**, mostly well grazed or partly improved, occurs frequently alongside the road in the eastern sector. Fields that are only partly improved and dominated by rushes are also frequent – these can be classified as **wet grassland (GS4)**. **Improved agricultural grassland (GA1)** is a feature of the central part of the study corridor. Field boundaries are usually by **stone walls (BL1)**, with **hedgerows (WL1)** notably scarce and almost entirely absent from the eastern part. Several small **lakes (FL)** occur close to the existing road – these are Cuilmore Lough, Tully Lough and Doogan Lough. **Semi-natural woodland (WN)** and **scrub (WS1)** occur alongside the Newport River, whilst scrub, often gorse dominated, also occurs alongside the road and in some of the fields. **Conifer plantations (WD4)** occur at Derrinumeera. The existing road has been improved, with some construction works ongoing, in the east half of the corridor. Road verges are often disturbed ground, now colonised by a weedy vegetation and can be accommodated in the category **recolonising bare ground (ED3)**. Some **bare ground (ED2)** also occurs. Road construction has left behind some exposed rock cuttings though these are largely unvegetated. **Buildings (BL3)**, with associated hard core areas and gardens, are frequent at Newport though scarce along the rest of the route. Whilst important estuarine habitats occur at Newport Bay, these would not be affected by the proposed development.

The principal natural or semi-natural habitat of conservation importance in the study area is the Newport River. Elsewhere, the habitats have low or negligible conservation value though the various small lakes are of local interest. There are no known rare or scarce plants (as listed in the Flora Protection Order 1999 or in Curtis & McGough 1988) in the area. The fauna found in the area is typical of the Irish countryside. There are no habitats to support concentrations of wintering waterfowl.

A summary of the habitats identified in the survey area is as follows (codes after Fossitt op.cit.) :

- Rivers FW2
- Drainage ditches FW4
- Lakes FL
- Improved agricultural grassland GA1
- Amenity grassland (improved) GA2
- Unmanaged land and grassy verges GS2
- Wet grassland GS4
- Wet heath HH3

- Semi-natural woodland WN
- Conifer plantation WD4
- Scrub WS1
- Hedgerows WL1
- Recolonising bare ground ED3
- Bare ground ED2
- Stone walls BL1
- Buildings and artificial surfaces BL3

3.2 Description of habitats, vegetation and flora along route

There follows a description of habitats and flora along the route from east to west. The distribution of principal habitats is shown, approximately, on the accompanying large-scale maps (Figure 1). A series of photographs showing various parts of the study area is presented in Appendix 3.

Note: the pipeline will follow the existing R311, including recent and ongoing realigned sections, from the landfill to Newport town. The habitat descriptions therefore concentrate on the habitats at the margins and alongside the road.

The entrance road to the landfill is surrounded to the west by an established conifer plantation and to the east by a recently planted plantation. Soils here are peat based, with heath and bog apparently the habitats present prior to planting. The entrance road to the landfill is lined by alder *Alnus glutinosa* trees and shrubbery.

The section of the R311 from the landfill to Cartron is relatively recent, with remnants of the original road surface still present (see Plate 1). Verges are wide, sometimes up to 10 metres, and in places are hardcore or gravel (see Plate 2). Normally, however, the verge is less than 5 m wide and is of rank grass, scrub and occasionally even remnant heath vegetation (see Plate 3). Species present in the grassy areas include common couch *Elymus repens*, cock's foot *Dactylis glomerata*, crested dog's tail *Cynosurus cristatus*, thistles *Cirsium* spp., nettle *Urtica dioica* and dandelion *Taraxacum* spp. Gorse *Ulex europaeus* scrub is a feature alongside the road and in some of the adjoining fields, as is bramble *Rubus fruticosus* dominated scrub. Rushes (both *Juncus effuses* and *J. inflexus*) occur in places indicating wet conditions. Occasionally, heath species such as bell heather *Erica cinerea*, heather *Calluna vulgaris*, purple moor-grass *Molinia caerulea* and tormentil *Potentilla erecta* survive along the road margins. At the wall/fence boundaries between the road verge and adjoining land, occasional hawthorn *Crataegus monogyna* and willow *Salix* spp. is found. The principal adjoining habitats in this area are wet heath and wet grassland, the latter improved to varying degrees. The wet heath has been heavily grazed.

From Cartron to Cuilmore a section of new road of c.1 km is under construction (see Plate 4). The habitats here are disturbed and the pipeline would presumably be laid in the already disturbed ground.

The R311 runs close to Cuilmore Lough but is separated by a strip of ground that includes a building and some scrub. Moving west of Cuilmore, the land is more

improved with improved grassland pasture being dominant. The road verges are narrower (1-2 m approximately) and comprise mostly grass (see Plates 5 & 6). A low treeline of alder occurs on the northern side of the road just west of the small road which runs along the west side of Cuilmore Lough (see Plate 5). Elsewhere along this section, fencelines are sometimes accompanied by low hawthorn. Doogan Lough is very close to the R311, being separated by a narrow field of improved grassland and some dense scrub (see Plate 7).

The R311 follows the Newport River from Drumlong to the town. The eastern section of this length, as far as the bridge, runs south of the river. The southern side of the road is skirted by a low grassy bank on which there is a low, well-maintained hawthorn hedge (see Plate 8). Telegraph wires run above the hedge. Beyond the hedge there is steeply sloped ground that supports a strip of deciduous woodland, mostly birch *Betula pubescens*. A wet drain runs along the base of the slope. On the river side, there is a grass verge of 1-2 m width (see Plate 9). Between the verge and the river bank, there is mostly woodland and scrub. This strip varies in width but is more than 10 m in places. Species present include ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, hawthorn and willow *Salix* spp.

After crossing the bridge, the road runs north of the river as far as the town. On the north side, opposite a disused mill type building, there is a low bank with a row of trees and shrubs (see Plate 10). Behind this is a mill race channel. Shortly after this, there is ribbon housing development that runs almost continuously to the town (see Plate 11). South of the road, a stand of low woodland and scrub occurs alongside the river just west of the old mill building. This includes ash and willow, with dense bramble cover over much of the area. The road then runs virtually alongside the river, separated only by a low stone wall.

The section of the pipeline which will run through the town is entirely within a built environment. The final section of pipeline leading to the proposed sewerage plant at Cuilcain would pass along a hedge-lined track that is partly overgrown. Hawthorn is the principal species.

3.3 Fauna

3.3.1 Mammals, amphibians and reptiles

The mammal species of most conservation interest which occurs in the study area is otter *Lutra lutra*. This species is known from the Newport River and is also widespread in Clew Bay (NPWS data, B. Madden previous observations).

A range of common species of the countryside were recorded in the area, including brown rat *Rattus norvegicus*, fox *Vulpes vulpes* and rabbit *Oryctolagus cuniculus*. Other ubiquitous species such as long-tailed field mouse *Apodemus sylvaticus* and pygmy shrew *Sorex minutus* would be expected, as well as less common though widespread species such as the Irish stoat *Mustela erminea* and badger *Meles meles*. It is noted, however, that no badger setts occur along the proposed pipe route. The Newport River corridor has good potential for bat species though elsewhere in the

survey area the potential is low due to the scarcity of tall trees. Bats could roost in the stonework associated with the bridge.

The common frog *Rana temporaria* is present in the area (spawn noted on flooded ground close to R311). However, there are no ponds in the survey area which could support newts *Triturus vulgaris*. The habitats along the route could support the common lizard *Lacerta vivipara*.

3.3.2 Birds

The majority of the bird species which occur within the survey area are common and widespread species of the open countryside. A list of all the species recorded during the survey, along with their scientific names, is given in Appendix 2.

Meadow pipits were widespread in the grassland fields and open areas of heath alongside the R311. Skylark is also present in the area. Snipe are probably widespread, as several were flushed from one of the wet fields near Derrinumeera. A further species of the wet grassland habitat is reed bunting.

Common birds of the scrub and woodland habitats include such species as blackbird, song thrush, wren and various tit and finch species. The wintering thrush, redwing, was recorded at several locations.

The Newport River provides good habitat for kingfisher *Atthis alcedo*, which is known to breed locally on the river (B. Madden, previous observations). Other wetland species which use the river include mallard, grey heron and cormorant. Grey wagtail is widespread on the river.

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4.0 EVALUATION OF ECOLOGICAL IMPORTANCE OF SURVEY AREA

Ecological interest within the survey area centers on the Newport River, which, as well as aquatic/fishery interests, supports otter and kingfisher, species listed on Annex II of the Habitats Directive and Annex I of the Birds Directive respectively. The river is of International importance, as shown by the SAC designation. The woodland and scrub alongside the river is considered an integral part of the riparian habitat.

Elsewhere, the existing R311 passes through habitats that are partly or largely improved, namely improved agricultural grassland, wet grassland and remnant heath. None of these habitats are of significant conservation importance. The various small lakes which occur to the south of the R311 appear of reasonable quality and are rated of Moderate Local value.

The survey area does not appear to support any rare or protected plant species (as listed in Flora Protection Order 1999 or in Curtis & McGough 1988).

Apart from the riparian fauna already referred to, the various fauna species which occur in the survey corridor are common species of the countryside and none is threatened or of particular conservation importance.

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5.0 PREDICTED ECOLOGICAL IMPACTS BY PROPOSED DEVELOPMENT

5.1 Characteristics of proposed development

Engineering details for the proposed scheme are not fully known but it is assumed that the pipe will be laid almost entirely at the edge of the existing road or in the verges. In addition to the trench, which is likely to be at least 1 m in width, there will be a need for a working wayleave which could be in the region of 10 m either side of the trench.

The principal impact by the scheme will be habitat disturbance due to trench excavations. This will involve the temporary loss of some habitats but the actual permanent loss of habitat will be minimal. Potential impacts on the various fauna species require consideration, as well as potential impacts on the designated areas for conservation in the vicinity. Impacts on the watercourses are discussed in a separate aquatic report.

5.2 Habitat disturbance

Along the largest length of the route, from Derrinumeera to the Newport River, the pipe line would affect road verges that comprise hard core, grass areas or disturbed ground (including remnants of the original road surface). Apart from a relatively short length of hedgerow at Cloonseahill, there are no hedgerows or treelines of note. The lands adjacent to the road, should it be required for working wayleaves, is predominantly wet or improved grassland and remnant heath. None of these habitats are of significant conservation value and disturbance by the development is rated as an impact of Minor significance. The various lakes to the south of the R311 would not be directly affected, though precautions would need to be taken during construction to prevent run-off (see mitigation measures).

The section of the route which runs alongside the Newport River could involve the removal of some of the woodland/scrub which skirts the river in the section east of the bridge crossing point. Disturbance of the road edge and grass verge would not be of concern from a habitats perspective but removal of trees and shrubs could be detrimental to the overall ecology of the river. Depending on how much tree/shrub removal would be required, this potential impact would be rated between Moderate and Major significance. If, however, the line is laid on the southern side of the road, disturbance of the grass bank and hedgerow there would only be rated as of Minor significance.

In the section west of the bridge crossing point, the route is likely to have less, if any, of a potential impact on the Newport River, as for much of the length there is ample hardcore areas associated with the existing developed areas. However, disturbance to the trees/shrubs and associated mill race channel along the north side of the road, opposite the disused mill building, would be of Minor to Moderate significance.

There are no ecological interests and hence impacts of potential concern in the section of the route which passes through the town towards the proposed sewerage plant.

5.3 Potential impacts on fauna

The various species of fauna (mammals, birds, amphibians) which occur along the pipe route would be largely unaffected by the scheme and all will continue to occur in the immediate vicinity. It is noted that no badger setts were located along the pipe route. Similarly, there are no colonies of nesting birds such as rooks or grey herons in any of the trees that could be affected.

As the pipeline is unlikely to have any direct impacts on the Newport River, it is considered that the otter and kingfisher populations would not be adversely affected. However, a significant pollution incident during construction could affect the food supplies of these important species.

The road bridge which crosses the Newport River could support roosting bats. Should the scheme involve any direct interference with the stonework of this bridge, then roosting bats, if present, could be affected.

Overall, it is considered that no species of fauna would be lost from the immediate area or unduly disturbed due to the proposed development and therefore the biodiversity of the local area would not be adversely affected.

5.4 Potential impacts on designated sites for conservation

The proposed scheme is likely to pass through the Newport River cSAC site, at least in the vicinity of the bridge crossing. There is a possibility that some disturbance, by way of tree and scrub removal, could be caused to the section of river east of the bridge crossing. Should an entire strip of vegetation require removal from along the bank at this stretch of river, then this would be a significant impact. However, if only minimal disturbance is caused to the trees and shrubs here, then the impact would be rated as a Minor to Moderate adverse impact.

Any pollution incident during construction works could have adverse impacts on the principal species of conservation importance associated with the river, namely otter and kingfisher (as well as other aquatic interests).

The proposed development is not anticipated to have any impacts on the Clew Bay cSAC.

6.0 MITIGATION MEASURES

6.1 Avoidance

The route should be aligned to avoid causing disturbance to the following habitats:

- The length of hedgerow (mostly alder trees) at Cloonsehil (see Plate 5)
- The woodland and scrub along the Newport River east of the road crossing. Should it be necessary to utilize any of the ground between the river and existing road, then consultations would be required with the National Parks & Wildlife Service in advance of construction. Also, any works in this sensitive area would need to be strictly supervised by an ecologist.
- The line of trees/shrubs on the grass bank alongside the mill race channel opposite the disused mill building just west of the crossing point (see Plate 10).

6.2 Reinstatement of trees and shrubs

Whilst there are no significant trees or hedgerows along the route, there is still a requirement to replace any tree or shrub removed during construction. Any native species should be replaced with a similar species (probably mostly hawthorn and ash), whilst non-native species such as sycamore should be replaced with ash or oak.

Note that banks and ditches that are disturbed should also be re-instated.

6.3 Protection of other habitats

Apart from the areas which should be avoided, the other habitats that will be disturbed are not of any particular conservation value and disturbance by pipe laying would not require specific mitigation measures. However, care is required to prevent run-off from construction areas reaching the three small lakes close to the R311 (Doogan Lough, Tully Lough, Cuilmore Lough).

6.4 Riparian animals

During the construction phase, strict pollution control measures will be required to prevent run-off or other pollutants from entering the Newport River and potentially affecting the food supplies of otter and kingfisher.

6.5 General measure for mammals

Overnight and during inactive periods at the construction stage, any open trenches should be fitted with temporary ramps to allow large animals that may fall in by accident to escape.

6.6 Measures for bats

If the road bridge over the Newport River is to be affected, then a survey would be required to establish whether the stonework provides a roost site for bats. This should be carried out in advance of construction by a qualified bat surveyor. Should bats be found, then mitigation measures would be required.

6.7 Measures for birds

Unless previously agreed with the National Parks & Wildlife Service, cutting and removal of trees, scrub, hedgerows or vegetation on uncultivated land, which provide breeding habitat for bird species, should take place outside of the bird nesting season, which is officially the period between March 1st and August 31st. This would comply with Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000².

7.0 LIKELY SIGNIFICANT IMPACTS AFTER MITIGATION MEASURES

Providing mitigation measures as outlined are followed, impacts on terrestrial ecology due to the proposed scheme are rated mainly as from Negligible to Minor. Should it be necessary to remove vegetation from along the bank of the Newport River, the impact is rated as potentially of Moderate to Major significance.

All fauna species are expected to continue to occur in the area after the construction is complete.

The mitigation measures outlined in the report if fully implemented will ensure compliance by the local authority with the various National and EU legislation relating to habitats and species.

² Refer to Section 46 of the Wildlife [Amendment] Act (2000) re. exemptions for certain construction works.

8.0 REFERENCES

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APPENDIX 1.

NPWS SITE SYNOPSIS

SITE NAME: NEWPORT RIVER

SITE CODE: 002144

The Newport river is a relatively short river, flowing from Beltra Lough to the sea at Newport, Co. Mayo. The site comprises a 7 km section of this river from Derrynafreva Lough to the railway bridge in Newport town.

It is a low-level river, which flows through wet grassland and wet heath. In parts the wet grassland is improved to varying degrees through the application of fertilisers. A small section in the east of the site flows through blanket bog. There are sections of the river bank which are wooded with deciduous trees. Some coniferous afforestation occurs close to the river in two areas.

The interest of this site lies primarily in the presence of a significant population of the Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the EU Habitats Directive and also protected under the 1976 Wildlife Act. A survey in 1995 estimated the population of the Pearl-mussel within the site at approximately 5,000 individuals. The water quality of the river is good and the mussels were found throughout the river system in both gravel and rocky bed areas.

For a large proportion of the river's course it flows through wet heath. This habitat is widespread throughout the east of the site where the depth of the peat is approximately 30-50 cm deep. The species which are present include Cross-leaved Heath (*Erica tetralix*), Bell Heather (*E. cinerea*), Heather (*Calluna vulgaris*), Purple Moor-grass (*Molinia caerulea*), Bulbous Rush (*Juncus bulbosus*), Heath Rush (*J. squarrosus*), Soft Rush (*J. effusus*), *Carex* spp., Tormentil (*Potentilla erecta*), Bilberry (*Vaccinium myrtillus*), Bog-myrtle (*Myrica gale*), lichen species (*Cladonia portentosa*, *C. uncialis*), Bracken (*Pteridium aquilinum*), Hard Fern (*Blechnum spicant*), with occasional Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), and Oak (*Quercus* spp.). Sphagnum mosses and liverworts are common. In the area adjacent to Derrynafreva Lough the rare Irish Heath (*Erica erigena*) is found in abundance. In parts of the site the heath community is dominated by Purple Moor-grass and Bog-myrtle.

Also found within the site is broad-leaved deciduous woodland which comprises Ash (*Fraxinus excelsior*), Hawthorn, Downy Birch (*Betula pubescens*), Alder (*Alnus glutinosa*), Willow (*Salix* spp.), Holly and Oak. In some places the woodland is rather open and is presumably grazed as indicated by the absence of ground flora. In other instances a more luxuriant growth of ground flora can be found. Typical species include Wood Sorrel (*Oxalis acetosella*), Hard Fern and Foxglove (*Digitalis purpurea*). In addition these areas are rich in ferns, liverworts, lichens and mosses. More swampy carr is found close to the river's edge, and more typically along

drainage channels and streams feeding into the river. These areas contain a higher percentage of Willow and Alder with occasional Oak. The ground flora in these areas is typically dominated by a tussocky Purple Moor-grass / Bog-myrtle community.

The other common habitat within the site is wet *Juncus* grassland. These areas support Soft Rush, Hard Rush (*J. inflexus*), Bent grasses (*Agrostis* spp.), Crested Dog's-tail (*Cynosurus cristatus*), Thistles (*Cirsium* spp.), Marsh Violet (*Viola palustris*), Cuckoo-flower (*Cardamine pratensis*), Creeping Buttercup (*Ranunculus repens*) and a good cover of mosses.

Otter, Badger, Irish Hare and Common Frog, four Red Data Book species which are also protected under the 1976 Wildlife Act, occur in the site. The Common Lizard is also believed to be present. It too is protected under the 1976 Wildlife Act.

The Kingfisher, a species listed on Annex I of the EU Birds Directive, has been recorded along the Newport River. The Red Grouse can be found on areas of wet heath within the site.

The Newport River is a renowned Salmonid river and the water quality is considered good. However, there are potential threats to the river water quality through nutrient enrichment, particularly from agricultural intensification. Further afforestation within the catchment could also pose a threat to the water quality. The Pearl-mussel is vulnerable to fishing.

The Newport River is an important site for the Freshwater Pearl-mussel, a species listed on Annex II of the EU Habitats Directive. The water quality of the river is good and the site supports populations of several protected species including Otter and Kingfisher. The rare Irish Heath is also known from the site.

17.1.2000

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APPENDIX 2.

BIRDS RECORDED WITHIN SURVEY AREA

Cormorant *Phalacrocorax carbo*
Grey heron *Ardea cinerea*
Mallard *Anas platyrhynchos*
Moorhen *Gallinula chloropus*
Snipe *Gallinago gallinago*
Woodpigeon *Columba palumbus*
Meadow pipit *Anthus pratensis*
Grey wagtail *Motacilla cinerea*
Pied wagtail *Motacilla alba*
Skylark *Alauda arvensis*
Wren *Troglodytes troglodytes*
Dunnock *Prunella modularis*
Robin *Erithacus rubecula*
Redwing *Turdus iliacus*
Blackbird *Turdus merula*
Song thrush *Turdus philomelos*
Mistle thrush *Turdus viscivorus*
Goldcrest *Regulus regulus*
Blue tit *Parus caeruleus*
Coal tit *Parus ater*
Great tit *Parus major*
Magpie *Pica pica*
Jackdaw *Corvus monedula*
Rook *Corvus frugilegus*
Hooded crow *Corvus corone*
Starling *Sturnus vulgaris*
Chaffinch *Fringilla coelebs*
Goldfinch *Carduelis carduelis*
Greenfinch *Carduelis chloris*
Bullfinch *Pyrrhula pyrrhula*
Reed bunting *Emberiza schoeniclus*

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APPENDIX 3.

**PHOTOGRAPHS SHOWING
PARTS OF PROPOSED ROUTE**

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Plate 1. The section of the R311 from the landfill to Cartron is relatively recent, with remnants of the original road route still present. View is looking westwards, close to Derrinumeera.



Plate 2. Verges along the R311 in the eastern sector of the survey area are wide, and in places are hardcore or gravel. View is of section of road between Derrinumeera and Cartron.

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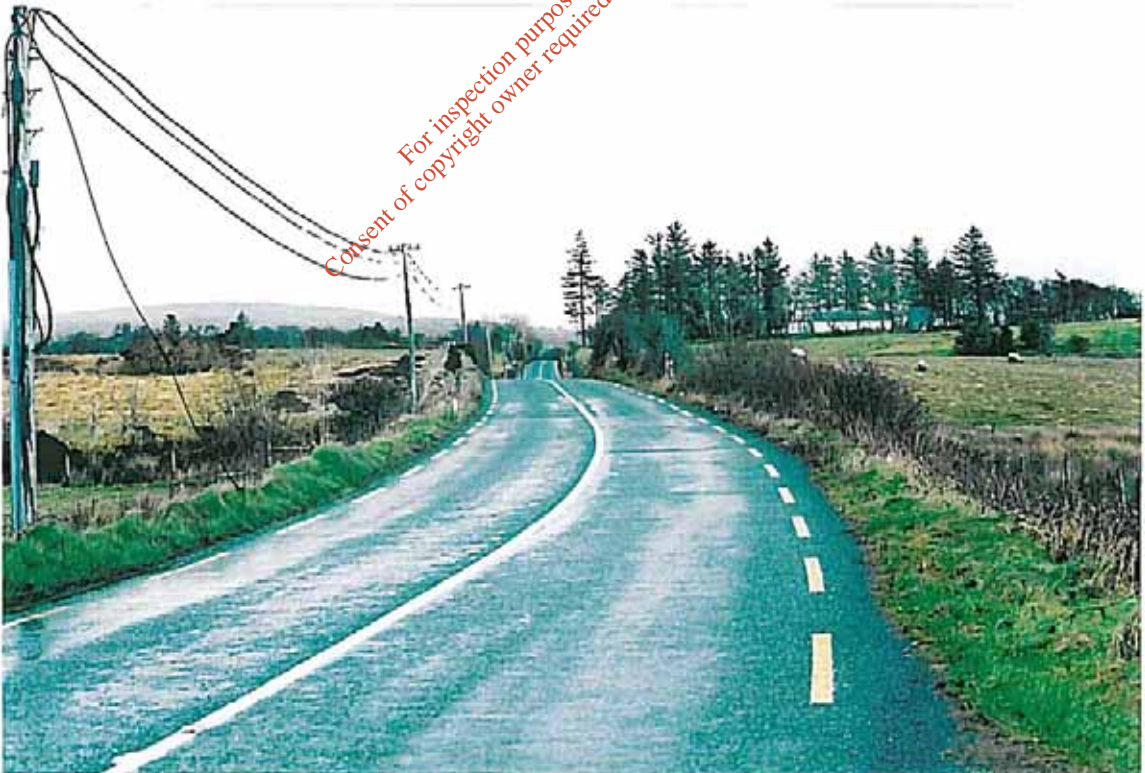


Plate 3. A typical road verge is c.5 m wide and is of rank grass and scrub. View is of section of road between Derrinumeera and Cartron.

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Plate 4. From Cartron to Cuilmore a section of new road of c.1 km is under construction. View is looking westwards.



Plates 5 & 6. West of Cuilmore, the road verges are narrower and comprise mostly grass. Upper photograph (looking west) shows a low treeline of alder along the road just west of Cuilmore Lough. Elsewhere along this section, fencelines are sometimes accompanied by low hawthorn, as shown in lower photograph (looking east).

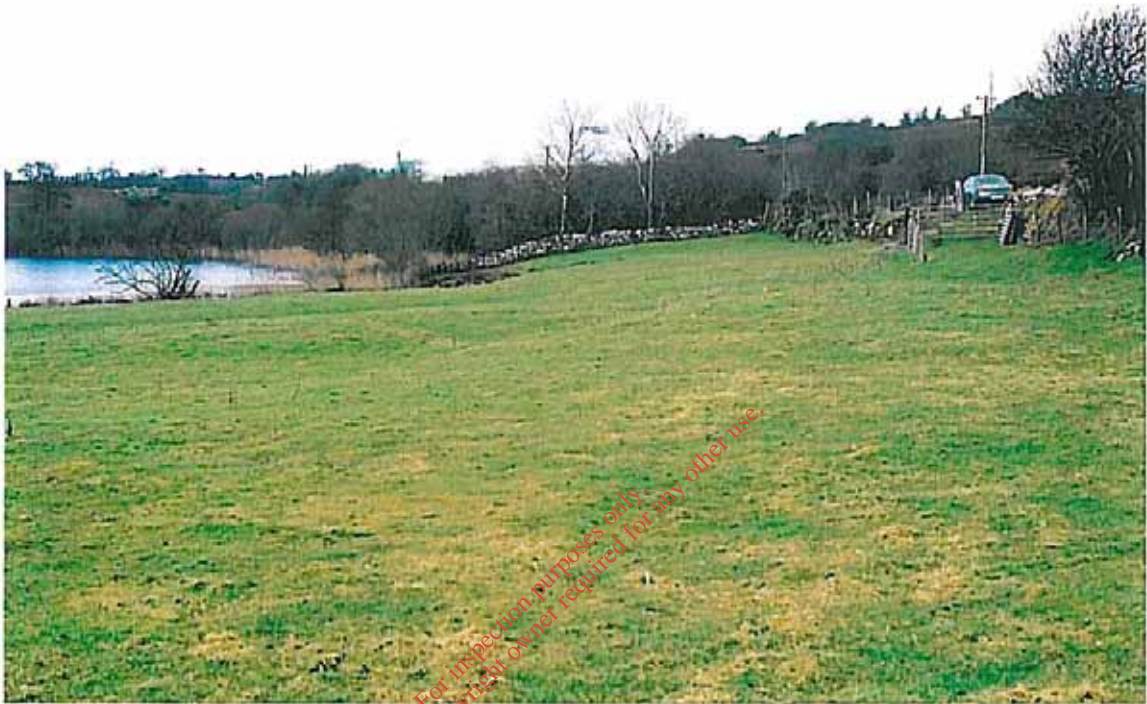


Plate 7. Doogan Lough is very close to the R311, being separated by a narrow field of improved grassland and some dense scrub. View is looking west.



Plate 8. View of grassy bank and low hedge which runs on the south side of the R311 where the road skirts the Newport River. A strip of woodland occurs on the slope behind the bank and hedge.



Plate 9. View looking west along the section of the R311 which skirts the Newport River. A grass verge occurs along the road and then woodland and scrub to the river bank.



Plate 10. After crossing a bridge, the road runs north of the river as far as Newport town. Opposite a disused mill building, there is a low bank with a row of trees and shrubs. Behind this is a mill race. View is looking west.






Plate 11. Ribbon housing occurs along the road towards the town. Along this section, the road runs virtually alongside the river, separated only by a low stone wall. View is looking west.

Figure 1. Principal habitats and landuse in survey area

LEGEND

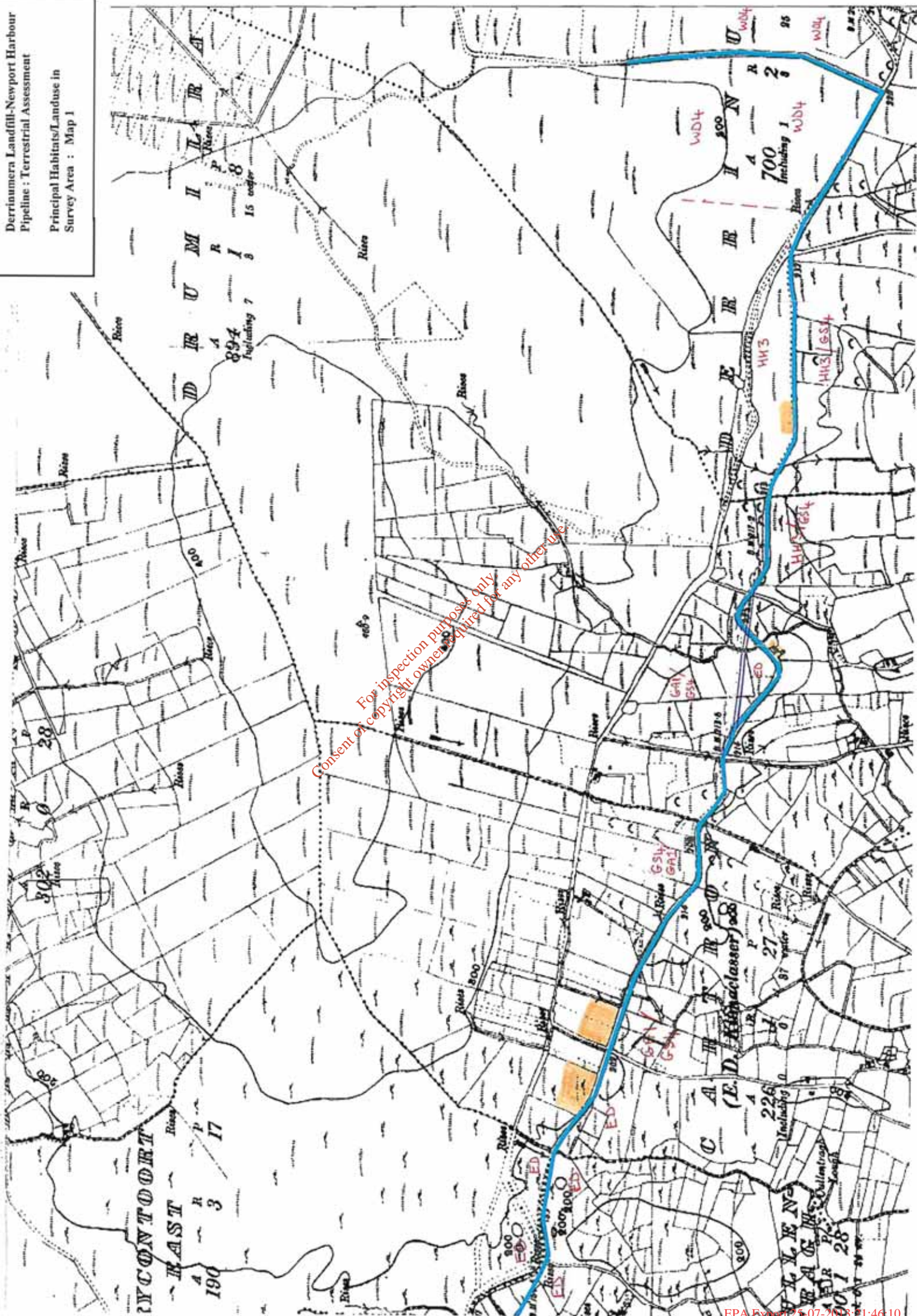
FL Lakes
GA1 Improved agricultural grassland
GS2 Unmanaged land, grass verges
GS4 Wet grassland
HH3 Wet heath
WD4 Conifer plantation
WS1 Scrub
WL1 Hedgerows
ED Disturbed ground

 Semi-natural woodland strips
 Low hedge on bank
 Developed land

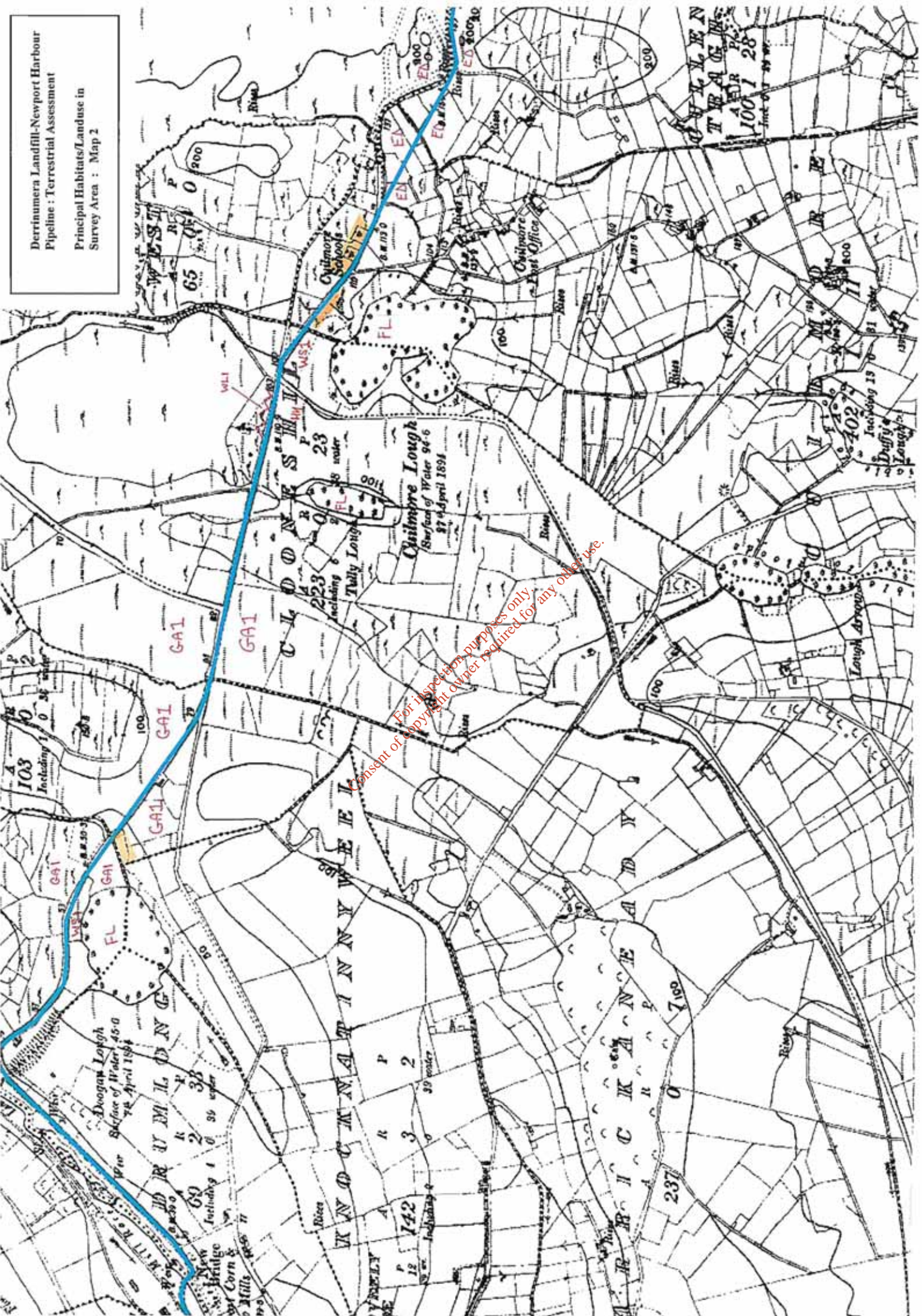
Note: Developed land is shown approximately both in location and area. Also, all developments are not plotted.

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Derrinmera Landfill-Newport Harbour
 Pipeline : Terrestrial Assessment
 Principal Habitats/Landuse in
 Survey Area : Map 1

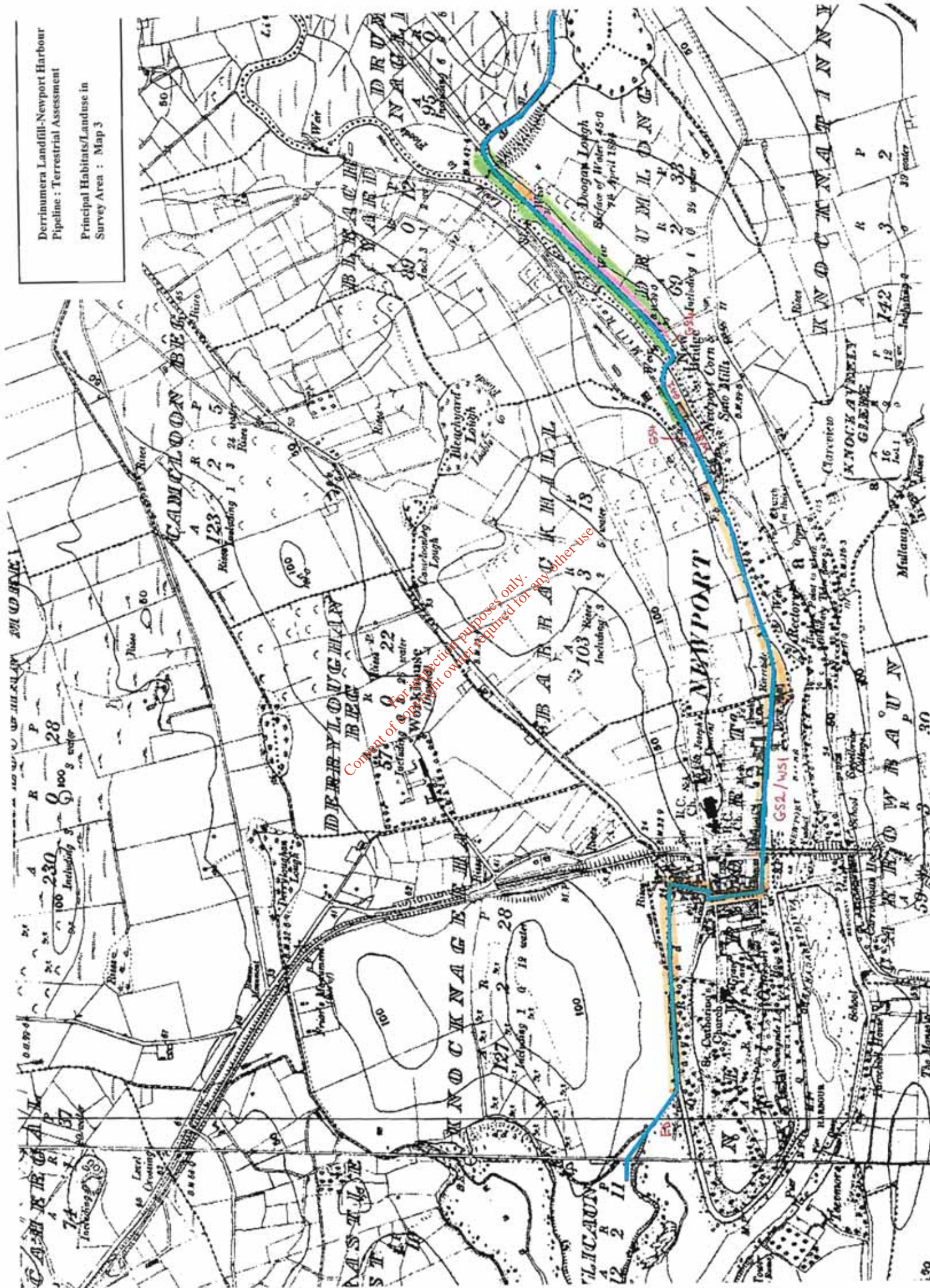


Derrinunera Landfill-Newport Harbour
Pipeline : Terrestrial Assessment
Principal Habitats/Landuse in
Survey Area : Map 2



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Derrinunera Landfill-Newport Harbour
 Pipeline : Terrestrial Assessment
 Principal Habitats/Landuse in
 Survey Area : Map 3



APPENDIX 5

Margaritifera Margaritifera Survey (Pipeline Route) [Moorkens, 2005]

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MARGARITIFERA MARGARITIFERA SURVEY OF STREAMS BELOW PROPOSED PIPELINE FROM DERRINUMERA LANDFILL SITE TO PROPOSED TREATMENT PLANT IN NEWPORT, CO. MAYO.

**Author: Evelyn Moorkens,
53, Charleville Square,
Rathfarnham,
Dublin 14.**

INTRODUCTION

The freshwater pearl mussel, *Margaritifera margaritifera*, is widespread in Ireland in rivers of low pH, but most populations have experienced a decline in recent years (Moorkens, 1999; Moorkens & Costello, 1994, Moorkens *et al.*, 1992). Deterioration in river bed and river water quality has resulted in the majority of mussel populations failing to recruit young mussels over the last 30 year period, and widespread extinction of mussel populations is predicted. The species is listed as "endangered" in the IUCN international red data book (Pyle *et al.*, 1996). Pearl mussels are a protected species, both in Irish law under the Wildlife Act, and under the European Union Habitats Directive, where it is listed in Annex II and V. The effect of these legislative provisions is to give protection to both the animal and its habitat.

The freshwater pearl mussel is known to occur in the Newport Catchment, and in a number of sites in County Mayo (Moorkens, 1995). The purpose of this survey is to determine whether the streams below the proposed pipeline along the R311 from Derrinumera Landfill Site N59 culverts support the pearl mussel.

In order to protect the freshwater pearl mussel, any action that might have an adverse effect upon the mussel can only be carried out under license. This includes mussel survey work (or any other form of research on mussels), as this has the potential to cause damage to the mussels. A license was obtained for this survey (License Number C54/2004).

TOBIN CONSULTING ENGINEERS CASTLEBAR		
PROJECT NO.		
FILE REF:		
Date Received	~ 4 MAR 2005	
PASS TO	ACTION BY	DATE

MATERIALS AND METHODS

Survey of adult *Margaritifera* is carried out with the animals *in situ* i.e. it is not permitted to remove live animals from where they are found, for purposes of survey. In order to minimise potential damage caused to mussels by survey, and to make comparison between survey results at different times and at different locations possible, a standard survey methodology has been developed, based on best practice and reliability (Anon., 2004). Those licensed to carry out *Margaritifera* survey work in Ireland are expected to use the standard methodology. For this survey, a standard Stage 1 survey was carried out.

Stage 1 survey: This survey establishes whether there are adult freshwater pearl mussels in a river. This is presence/absence survey based on search of those sections of a river exhibiting features most likely to support pearl mussels. As the water was always less than 75cm deep in the streams, search was based on the use of a "glass-bottomed" bucket and wading.

RESULTS

No mussels were found in any of the ten streams surveyed. The locations of the ten streams are shown in Figure 1.

It was not possible to survey the Newport River during this exercise, due to visibility conditions and weather constraints. However, living mussels could commonly be seen from the bank through a bathiscope, downstream of the bridge and along the proposed pipeline route.

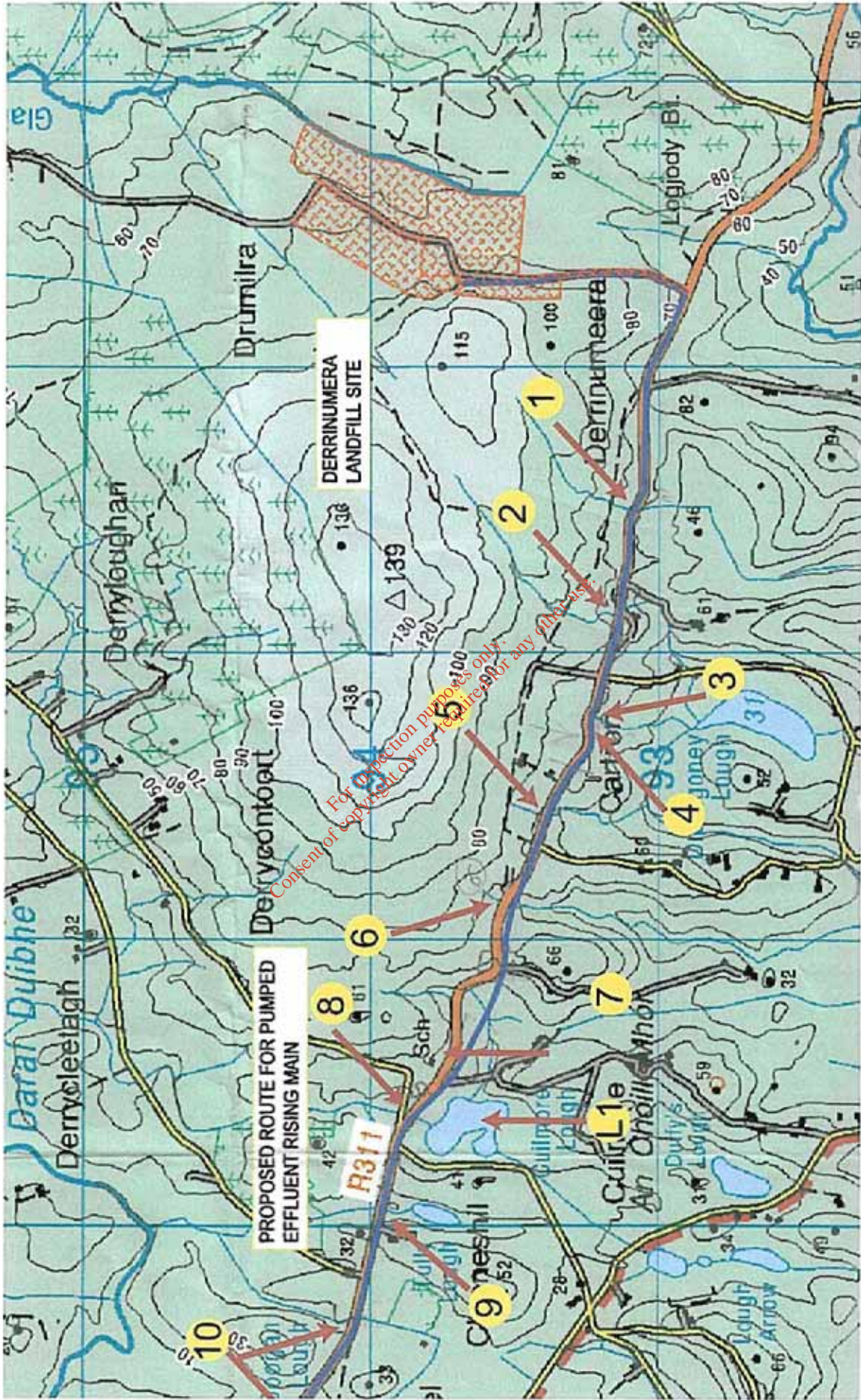


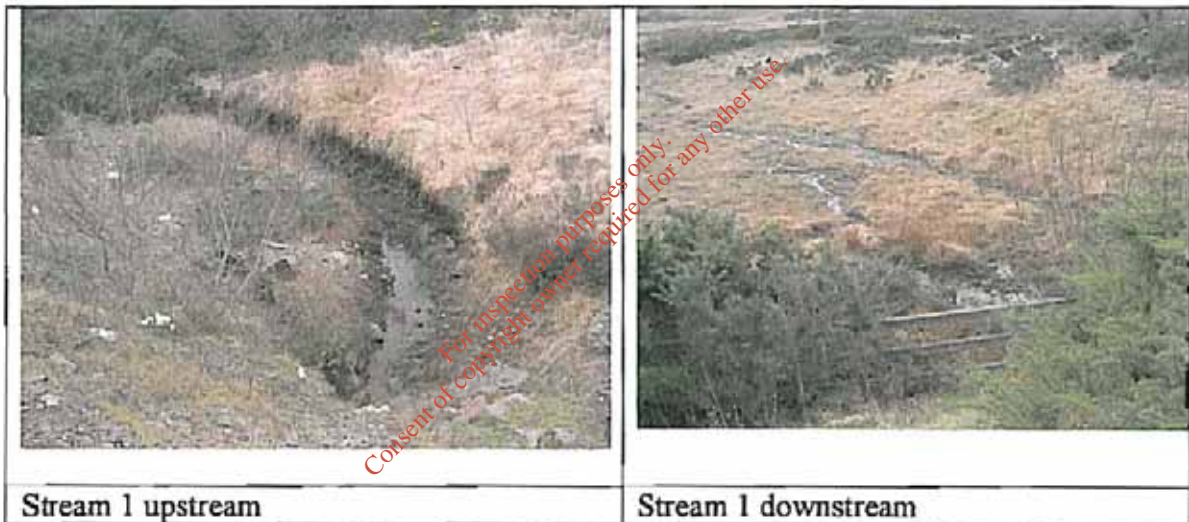
Figure 1: Pipeline Route - locations of sampled streams and lakes

Stream 1

Stream 1 crossed the proposed pipeline route at M 03493 93086.

This is a ribboned series of natural and vegetated trickling streams. Upstream of the R311 it loops around impediments including prior road rubble. Downstream of the road it is shallow and slow flowing, creating good quality *Deschampsia* wetland along its route. This is not pearl mussel habitat and no evidence of *Margaritifera* was found.

However, this stream feeds the Owennabrockagh River, and conditions were not conducive to assessing this larger river for pearl mussels. However, this stream is small, and water entering the river below is unlikely to account for a significant percentage of the Owennabrockagh River at any time of the year. Mitigation measures should be employed in any event, in order to prevent deterioration of the stream habitat. Therefore, best practice measures to prevent silt entering this stream should be utilized, such as straw bale / managed silt trap installations for the duration of works. Silt laden material should not be built up at the top of the slope when digging the pipeline.



Stream 2

Stream 2 crossed the proposed pipeline route at M 03151 93127.

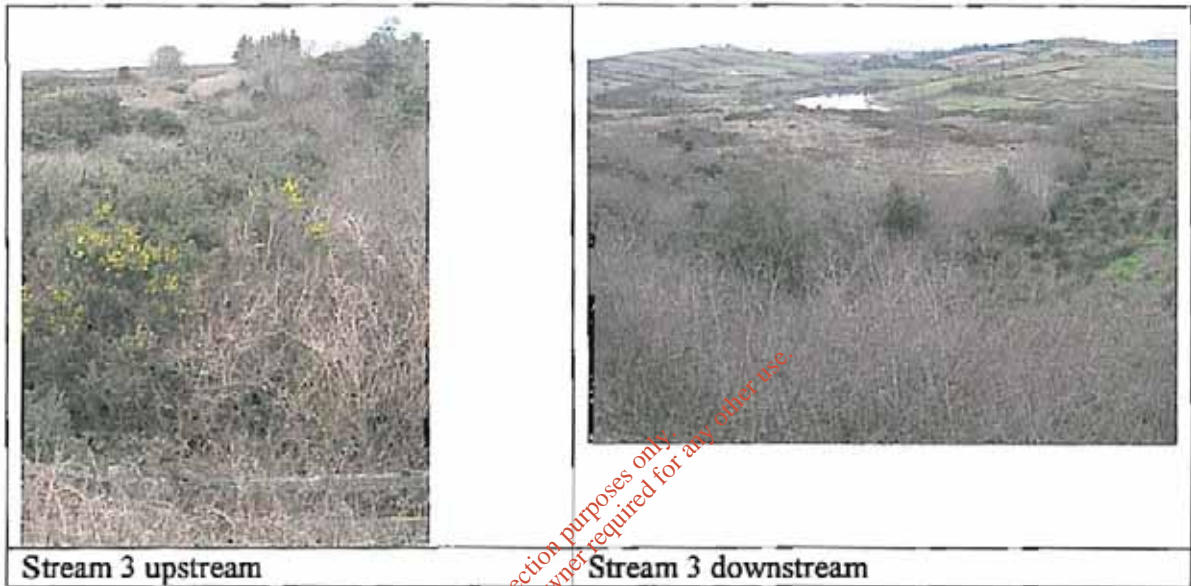
This short stream has a waterfall upstream of the R311, and downstream flows in a south westerly direction towards Drumgoney Lake (also known as “Leg of Mutton” Lake). Upstream this stream has a steep waterfall, with no *Margaritifera* potential. Downstream the river is very shallow and may dry up at times. There was no evidence of *Margaritifera* found in this stream. Standard precautions should be taken to prevent pollution from silt runoff.



Stream 3

Stream 3 crossed the proposed pipeline route at M 02778 93238.

This stream also flows into Drumgoney Lake, but in this case directly, in a southerly direction. This shallow, overgrown stream is not suitable habitat for Margaritifera, and none were found. Standard precautions should be taken to prevent pollution from silt runoff.



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Stream 4

Stream 4 crossed the proposed pipeline route at M 02754 93254.

This is a gorse and *Juncus*-lined stream probably obtaining most of its water from field drainage upstream. Continued drainage has led the stream to flow in a westerly direction parallel to the road. It appears to meet Stream 3 in this manner. There is no potential for pearl mussels to live in this habitat.



Stream 5

Stream 5 crossed the proposed pipeline route at M 02439 93379.

Upstream, this is a small, iron-stained stream that has been deepened for drainage purposes, with natural boulders removed from the stream in the past. Downstream, the culverted stream opens again into a natural, stoney stream.

No *Margaritifera* were found during the survey, and this is likely to be due to low flows during some parts of the year. This stream flows towards the Rossow River, which has no records of pearl mussels, but was not surveyed during this investigation.

As with Stream 1, mitigation measures should be employed in any event, in order to prevent deterioration of the stream habitat. Prevention of silt runoff is recommended. Recent works to widen and straighten the R311 have resulted in the piling of rocks incorporating fine material. This has the potential to result in siltation of the stream following heavy rain, and further digging in the area could exacerbate the problem. The bare margins should be vegetated soon after completion of works, if it has not been done already.



Stream 6

Stream 6 crossed the proposed pipeline route at M 02123 93487.

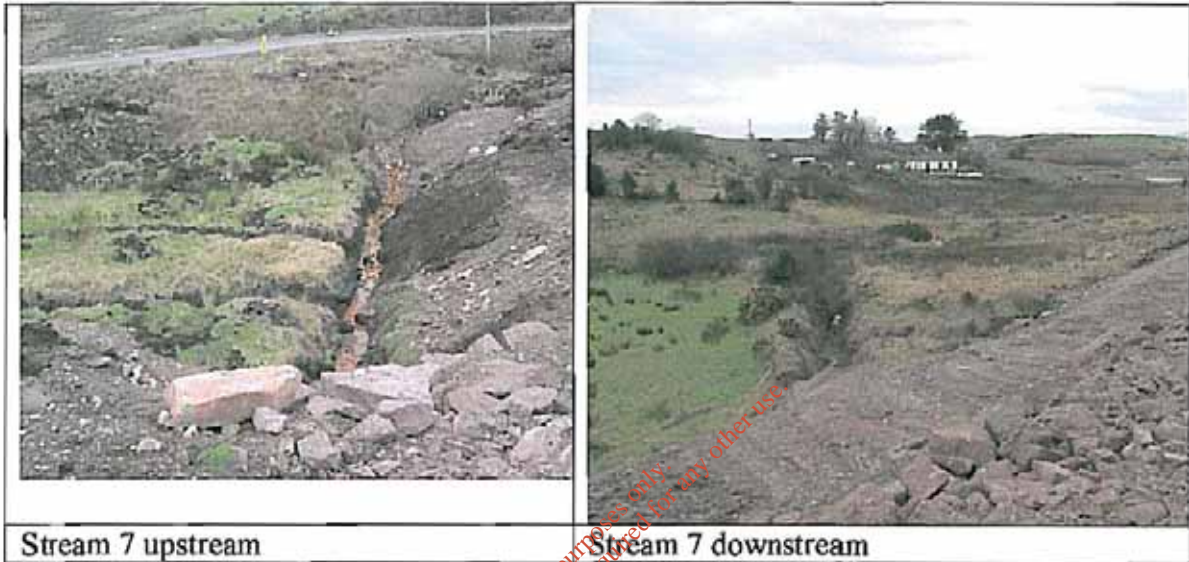
This is a very small stream and has no potential habitat for *Margaritifera*. It meets Stream 5 approximately 1 kilometre downstream of the road and the resulting stream then flows towards the Rossow River. Below the road it cuts through wetland valley habitat. The same precautions as at Stream 5 above should apply.



Stream 7

Stream 7 crossed the proposed pipeline route at M 01780 93613.

Upstream, this is an iron-stained narrow and shallow stream. Downstream the stream has a shallower slope than it has upstream of the road and it is silted in places as it makes its way towards Lough Culmore to the south west. There were no pearl mussels found in the stream.

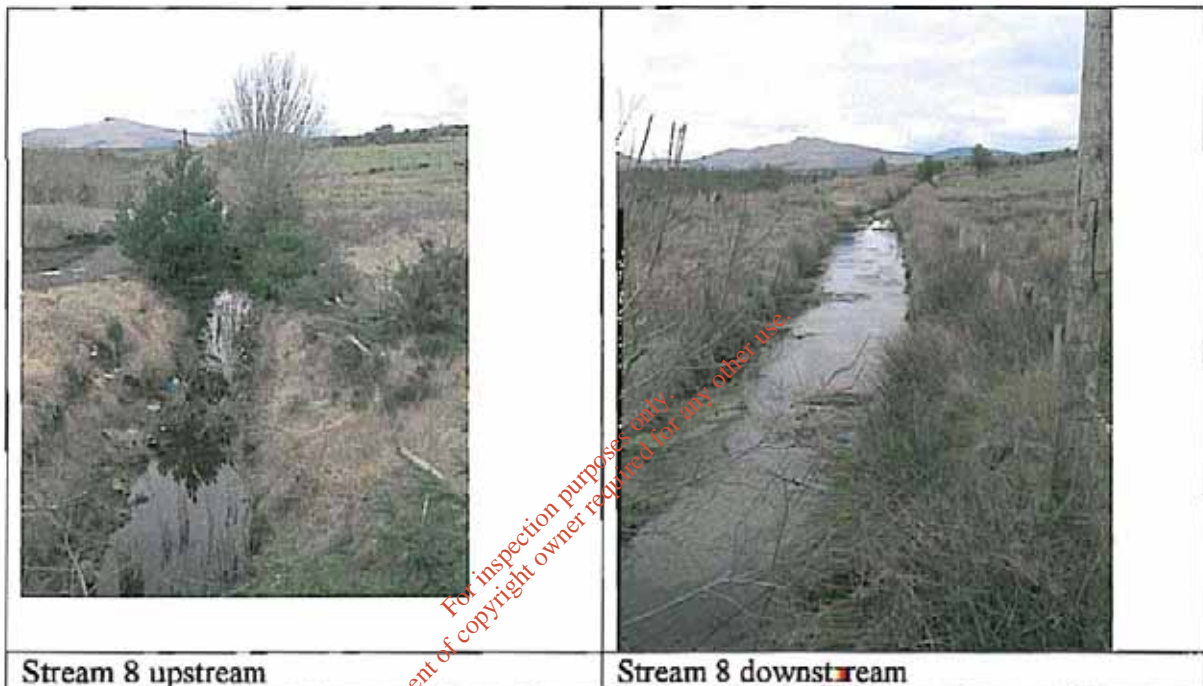


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Stream 8

Stream 8 crossed the proposed pipeline route at M 01383 93613 .

This stream also flows to Cuilmore Lough, but has been widened, deepened and canalized in the past. It is slow and silted, and the close to its confluence with the lake is likely to further impede flow. Standard precautions should be taken to prevent silt runoff causing pollution to the stream of the lake below.



Stream 9

Stream 9 crossed the proposed pipeline route at M 01059 93964.

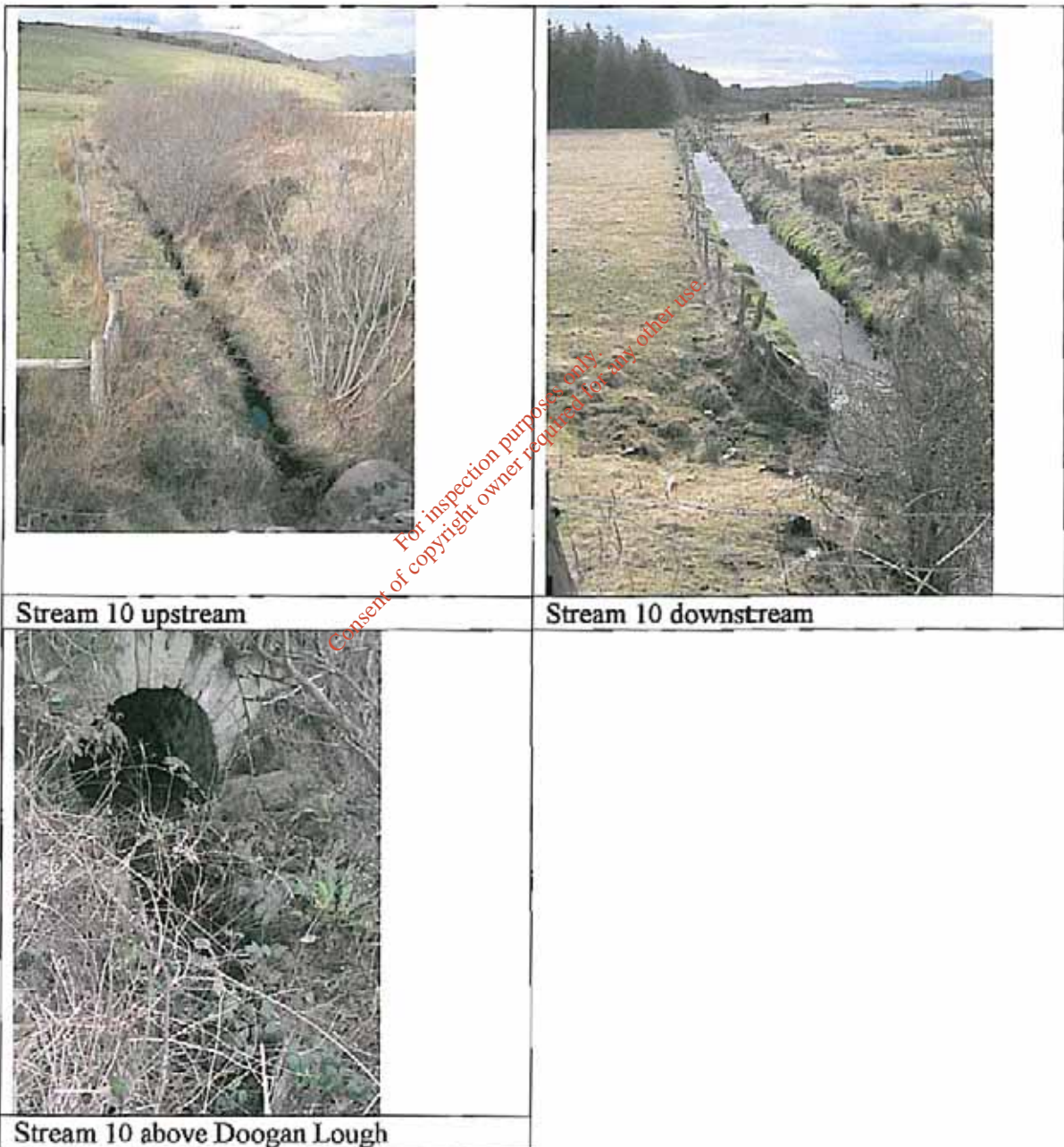
This narrow stream flows under a stone road bridge towards Tully Lough. The slow flow and deep, narrow banks make this unsuitable habitat for *Margaritifera*. No pearl mussels were found.



Stream 10

Stream 10 crossed the proposed pipeline route at M 00682 94057.

This stream flows into Doogan Lough. This is also a very narrow stream that has been straightened for drainage purposes along its route to the lake. It has evidence of siltation between the road and the forestry plantation below. Following the plantation, the stream changes direction and flows in a north westerly direction until the R311 is reached again. It then flows directly south to Doogan Lough. There was no *Margaritifera* found in the stream. Standard precautions should be taken to prevent further silt runoff.



DISCUSSION

This survey has established that none of the ten streams on the proposed route of the R311 above the Newport River contain a population of pearl mussels. It is recommended that measures are taken to prevent silt movement into the streams, most particularly at Streams 1, 5 and 6, which flow into larger rivers downstream of the proposed works.

While a full survey of pearl mussels in the Newport River was not possible, the mussels appear to still be numerous, and the river is a cSAC for the species. Former work suggests that the majority of the mussels occur below the bend in the R311, which coincides with the proposed pipeline route. Pearl mussels are particularly sensitive to silt runoff (Moorkens, 2000). A short episode of silt pollution can kill all pearl mussels below in the age group of 0+ to 5+. This is due to the sediment in which they are living becoming starved of oxygen. A prolonged silt episode can kill adult as well as juvenile mussels. This is due to the adult mussels' response to silt, i.e. claming tightly shut for the duration of the siltation. If claming is prolonged, the mussels become starved of oxygen and die.

The extent of pipeline proposed to run along the Newport River (up to 1.5km), and the fact that it coincides with the main concentration of the mussel population, suggests that this route should be avoided if at all possible. If this is impossible, consideration should be given to locating the pipeline a number of metres away from the road at the side opposite the road from the river. In any case, silt should be prevented from reaching the road, as runoff from the road is likely to be carried into the river.

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APPENDIX 6

Laboratory Results for Kick Sample [TES, 2003]

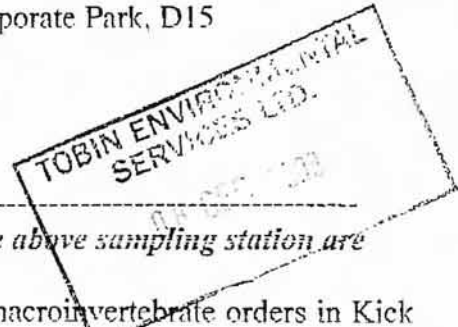
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**Client**

Caoimhe Muldoon, TES, Unit 4B/5, Blanchardstown Corporate Park, D15

Sample description

Kick sample for biological analysis SW001

Date submitted22nd September 2003

Macroinvertebrate taxa collected and identified from the above sampling station are listed in Table 1.

Table 1. Numbers of organisms belonging to selected macroinvertebrate orders in Kick Sample SW001 and their Q-group according to the EPA Quality Rating System.

Phylum	Taxic Group	Q Group	Number
Mollusca	Class Gastropoda		
	<i>Limnea</i> sp.	D	18
	Class Bivalvia		
	<i>Sphaerium</i> sp.	D	1
Arthropoda	Class Insecta		
	Order Coleoptera		
	Family Dytiscidae		
	<i>Dytiscus</i> sp.	C	5
	Order Diptera		
	Family Chironomidae (ex. <i>Chironomus</i> and <i>Rheotanytarsus</i>)	D	3

Number of Taxic Groups	4
Total Abundance	27
Overall Q-Rating	2-3
Shannon-Weiner Equitability Index (J')	0.68
Berger-Parker Dominance Index Value (1/d)	1.5

This sample contained only group C and D fauna, and was dominated by limneid snails. This resulted in a Q-value of 2-3 being assigned, indicative of moderate levels of pollution (assuming the sample was taken from a riffle zone). The sample contained large quantities of quite coarse organic matter however, indicating that the sample was not taken from an area of reasonably high water velocity. If this is correct, I suggest that a Q-value of 3 may be more appropriate.

Signed:  (Dr Martyn J. Linnie)

Date of Report: 15 December 2003

Our ref: 01/09

Prepared by Scientific Resources Ltd. TCD. Tel. 01-6799943

APPENDIX 7

Report on Biological Survey of Glaishtwy River [EPA 2004]

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Report to Mayo County Council on Biological Surveys of the Glaishwy Stream for the June and December 2004

River and Code : **GLAISHWY*** 32/G/12
 Tributary of : Lough Beltra OS Catchment No: 108
 OS Grid Ref : M 050 960 Date(s) Surveyed : 29 June 2004 and 22 Dec 2004

Sampling Stations No. Location	Biological Quality Ratings (Q Values)				
	Jun 00	May 01	Dec 01	Jun 02	Dec 02
0050 1km u/s Glaishwy Br	-	-	-	-	-
0100 Glaishwy Bridge	3	3	3	3	3-4

Sampling Stations No. Location	Biological Quality Ratings (Q Values)			
	Jun 03	Dec 03	Jun 04	Dec 04
0050 1km u/s Glaishwy Br	-	-	3	-
0100 Glaishwy Bridge	3-4	3-4	4	4

Assessment: The stream was surveyed on 29 June 2002 and 22 December 2004. An additional site was added to the survey in June 2004, 1 km upstream of Glaishwy Bridge (see map attached). This was added in order to assess the extent of the improvement in water quality which was noted at Glaishwy Bridge itself and to assess the sources of siltation apparent in the river.

The June 2004 rating of Q4 at Glaishwy Bridge is the first time a satisfactory quality rating was assigned to the river at this point. Both the June and December 2004 surveys showed unpolluted conditions at Station 0100. Salmonid redds containing apparently viable eggs were noted for the first time here in December 2004. Greater numbers of *Leuctra* were recorded and *Ecdyonurus* was recorded for the first time in June 2004. Both *Rhithrogena* and *Heptagenia* were noted in December 2004 plus some stonefly species. Together these indicate a consistent improvement in water quality in 2004 compared with all previous surveys at Glaishwy Bridge (Station 32G120100).

The new site (0050) surveyed 1km upstream of Glaishwy Bridge and approximately 1 km downstream of the landfill at Derrinnumera was, however, moderately polluted in June 2004. This suggests that the smaller streams entering the Glaishwy downstream of this point are providing sufficient dilution to counteract the current level of pollution from the upper reaches. It is clear also that the extensive afforestation and clear-felling activities in the catchment have had a significant affect on the stream particularly in regard to the siltation noticeable on the streambed. Station 0050 was not surveyed in December 2004.

Martin McGarrigle,
 19/05/05
 Regional Manager
 Environmental Protection Agency
 John Moore Road
 Castlebar
 Co. Mayo

Glaishwy Survey 2004

