

6. MITIGATION MEASURES

The trees along the SE and NE boundaries will be maintained and augmented by planting of willows and other native species within the site. Alder is already widespread in the area.

References

Fossitt, J.A. 2000. *A guide to habitats in Ireland*. Heritage Council.

JNCC (Joint Nature Conservation Committee) 1990. *Handbook for Phase I habitat survey - a technique for environmental audit*. Peterborough.

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**Conservation Services Ltd.
AQUATIC ECOLOGY**

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**KILLARNEY WASTE DISPOSAL LTD WASTE LICENCE
APPLICATION EIS**

AQUATIC ECOLOGY REPORT

July 2004

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1. INTRODUCTION

As part of the EIS for the waste licence application for the Killarney Waste Disposal Ltd facility at Aghacurreen, Killarney, County Kerry, RPS-MCOS Ltd. have commissioned Conservation Services, Ecological and Environmental Consultants to carry out an aquatic ecological survey. The aims of the survey are:

- To assess the fishery amenity value, invertebrate fauna, aquatic flora, water quality, habitat value and general ecological condition of watercourses in the vicinity of the facility and provide baseline data against which future changes can be assessed
- To assess the potential impact of the facility on water quality and aquatic flora and fauna (not including potential impacts of transport, treatment and disposal of effluent tankered off the site).
- To suggest amelioration measures where negative impacts are predicted.

The following bodies were invited to provide information/comments for this report:

South Western Regional Fisheries Board
National Parks & Wildlife Section of DOEHLG
Central Fisheries Board
Marine Institute

The field work was carried out on the 12th, 22nd & 23rd July 2004.

2. METHODOLOGY

2.1. SELECTION OF WATERCOURSES AND SITES FOR ASSESSMENT

A surface water drain (the "Aghacureen Drain") flows through the site in a south west to north east direction. At the north eastern boundary of the site, the drain flows south east along the site boundary to the access road, where it again turns in a north easterly direction and flows to a tributary of the Glanooragh river at Grid Ref. V9403 9436. To establish the water quality status of the Aghacureen Drain, five sampling sites were established; three upstream of the facility (Sites A - C), and two downstream of the facility (Sites D & E) (see Fig. 1). To establish the water quality of the Glanooragh River for 4.5km downstream of the facility, four assessment sites were established (Sites 1 - 4). Sampling sites 1 - 4 are shown on Map 1.

Site	Grid Ref	Location	Q-rating assessment	Fish assessment
A	V9342 9380	c. 200m upstream of facility	✓	
B	V9357 9384	Just upstream of site boundary	✓	
C	V9359 9385	Just downstream of site boundary	✓	
D	V9374 9395	Just downstream of facility	✓	
E	V9402 9432	c. 550 downstream of facility	✓	✓
1	V9399 9436	Glanooragh River just upstream of confluence with Aghacureen Drain	✓	✓

Site	Grid Ref	Location	Q-rating assessment	Fish assessment
2	V9407 9435	Glanooragh River just downstream of confluence with Aghacureen Drain	✓	✓
3	V9493 9433	Glanooragh River c.1km downstream of confluence with Aghacureen Drain	✓	✓
4	V9569 9643	Glanooragh River c.4km downstream of confluence with Aghacureen Drain	✓	✓

2.2. HABITAT ASSESSMENT

Habitat quality for salmonid fish is primarily a function of 'naturalness' and diversity. The more diverse the river/stream habitat in terms of substrate, flow rate, depth, riparian vegetation, light conditions etc., the richer the biological community is likely to be, and the more suitable it is likely to be for salmonid fish (trout and salmon). Habitat assessment was carried out at each of the Q-rating sites. These sites were assessed in terms of:

- Stream width and depth
- Substrate type, listing substrate fractions in order of dominance, i.e. large rocks, cobble, gravel, sand, mud etc.
- Flow type, listing percentage of riffle, glide and pool in the sampling area
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampling site

- Dominant bankside vegetation, listing the main species overhanging the watercourse
- Estimated degree of shade of the sampling site by bankside vegetation
- Conductivity measurement using a TDSscan3 conductivity meter
- Dissolved oxygen using an EcoScanDO6 dissolved oxygen meter
- Rating of the site as habitat for salmonid adult, nursery and spawning on a scale of None/ Poor/ Fair/ Good/ Very Good/ Excellent broadly based on the qualitative procedure described by Kennedy (1984). This rating assesses the physical suitability of the habitat; the presence/absence/density of salmonids at the site will also depend on present and historical water quality and accessibility of the site to fish. A rating of "none" indicates that the ecologist carrying out the assessment regards it as impossible that the stream could support salmonid fish in the relevant life stage. A rating of "None - Poor" indicates that it is regarded as possible but extremely unlikely that the stream could support salmonid fish in the relevant life stage.

A general assessment of salmonid habitat quality was carried out on the Aghacureen Drain from where it enters the facility site to where it joins the Glanooragh River, and on the Glanooragh river for c.4km downstream of its confluence with the Aghacureen Drain. Assessment consisted of walking/wading the stream channel. Salmonid habitat quality was assessed, taking into account width, depth, type of flow (riffle/glide/pool), bottom material, bankside vegetation, etc. Based on these criteria, the potential value of each stream section for spawning, as a nursery area for juveniles, and as an area for adult salmonids, was estimated. To illustrate the habitat quality photographs were taken using an Olympus μ 300 digital camera.

2.3. INVERTEBRATE SAMPLING AND WATER QUALITY ASSESSMENT

A five-minute kick and stone wash invertebrate sample was taken at all sampling sites (ISO 7828:1985). Each sample was retained in a large plastic bag at the sampling site. Sample processing and preservation was carried out under laboratory conditions within 24 hours of sampling. Mud was removed from each sample by sieving under running water through a 500µm sieve. Sieved samples were then live sorted for 30 minutes in a white plastic sorting tray under a bench lamp (ISO 5667-3:1994). Macroinvertebrates were stored in 70% alcohol. Preserved invertebrates were identified to the level required for the EPA Q-rating method (McGarrigle *et al*, 2002) using high-power and low-power binocular microscopes when necessary. The preserved samples have been archived for future examination or verification. Based on the relative abundance of indicator species, a biotic index (Q-rating) was determined for each site in accordance with the biological assessment procedure used by the Environmental Protection Agency (Statutory Instrument No. 258 of 1998, & McGarrigle *et al* 2002) and more detailed unpublished methodology (McGarrigle, Clabby and Lucey pers. comm.)

2.4. GUIDELINES USED FOR CLASSIFICATION OF IMPORTANCE OF FRESHWATERS

Rating

A Internationally Important

Habitats designated as SACs for Annex II species under the EU Habitats Directive. Major Salmon river fisheries. Major salmonid lake fisheries.

Rating

B Nationally or Regionally Important

Other major salmonid waters and waters with major amenity fishery value. Commercially important coarse fisheries. Waters with important populations of species protected under the Wildlife Act and/or important populations of Annex II species under the EU Habitats Directive. Waters designated or proposed as Natural Heritage Areas by Dúchas.

C High Local or County Importance

Small water bodies with known salmonid populations or with good potential salmonid habitat, or any population of species protected under the Wildlife Act and/or listed Annex II species under the EU Habitats Directive. Large water bodies with some fisheries value.

D Moderate local importance

Small water bodies with some coarse fisheries value or some potential salmonid habitat. Any stream with an unpolluted Q-value rating.

E Low value

Water bodies with no current fisheries value and no significant potential fisheries value. Habitat diversity low and degraded.

System developed by Conservation Services and published in 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA 2004).

2.5. ASSESSMENT OF SIGNIFICANCE OF POTENTIAL IMPACTS

Impacts are defined on the basis of severity of impact on salmonid fish or any rare, protected, or commercially significant species and/or habitats. Assessment of the importance of a potential impact takes into account not only the ecological considerations in the immediate vicinity of the potential impact, but also geographical and wider catchment considerations. If spawning and nursery

habitat are limiting factors in short supply in a particular river system, then impacts on them will have an importance out of proportion with their apparent 'face value'.

Because of their amenity, commercial and legal status, salmonid fish (trout and salmon) are given special consideration. If an aspect of a proposed development is judged likely to have a measurable negative effect on salmonid fish populations, it would be classified as a significant potential impact. The criteria for assessing the significance of impacts on flora, fauna and fisheries are as follows. (For details of water-body categories see section 2.4)

A Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	MAJOR	SEVERE	SEVERE	SEVERE
Localised	MAJOR	MAJOR	SEVERE	SEVERE

B Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	MAJOR	MAJOR	SEVERE	SEVERE
Localised	MODERATE	MODERATE	MAJOR	MAJOR

C Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	MODERATE	MODERATE	MAJOR	MAJOR
Localised	MINOR	MODERATE	MODERATE	MODERATE

D Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	MINOR	MINOR	MODERATE	MODERATE
Localised	NOT SIGNIFICANT	MINOR	MINOR	MINOR

E Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	NOT SIGNIFICANT	NOT SIGNIFICANT	MINOR	MINOR
Localised	NOT SIGNIFICANT	NOT SIGNIFICANT	NOT SIGNIFICANT	NOT SIGNIFICANT

System developed by Conservation Services and published in 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA 2004).

In line with the EPA guide lines the following terms are defined when quantifying duration;

Temporary: Up to 1 year,

Short-term: From 1 to 7 years

Medium-term: 7 to 15 years

Long-term: 15 – 60 years

Permanent: over 60 years.

For the purposes of this report 'localised' impacts on rivers are loosely defined as impacts measurable no more than 250 metres from the impact source. 'Extensive' impacts on rivers are defined as impacts measurable more than 250m from the impact source. Any impact on salmonid spawning habitat or nursery habitat where it is in short supply, would be regarded as an extensive impact, as it is likely to have an impact on the salmonid population beyond the immediate vicinity of the impact source.

2.6. LIMITATIONS ENCOUNTERED

No significant limitations were encountered.

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3. EXISTING ENVIRONMENT

3.1. GENERAL CATCHMENT INFORMATION

The KWD Ltd facility is in the catchment of the Glanooragh River which flows to the Gweestin River c.10km downstream of the KWD Ltd site. The Gweestin flows for a further c.10km before joining the River Laune.

The Laune is described by O'Reilly (2002) as "*a great salmon and trout river – both sea trout and brown trout*". In its 2001 survey EPA found the Laune to be "mostly satisfactory but slightly polluted downstream of Lough Leane and at the lowermost location which is some 1.5km downstream of the moderately polluted Gweestin River" (Clabby *et al* 2002). While most of the main channel was found to be satisfactory, EPA recorded moderately polluted conditions at the lowest monitoring site on the Gweestin River.

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3.2.2. Water Quality/ Invertebrate Fauna

3.2.2.1. SITE A

The very small size of the water course at this site renders it less than optimal for Q-rating assessment. The invertebrate community recorded at this site and tabulated below merits a tentative Q-rating of Q3 or Q3-4, indicating moderately polluted or slightly polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None recorded	
B	Moderately Pollution Sensitive	Nemouridae	2
C	Moderately Pollution Tolerant	<i>Gammarus duebeni</i>	c.90
		Polycentropidae	3
		Glossosomatidae	3
		Hydracarina	2
		Curculionidae	2
		Chironomidae (excl. <i>Chironomus</i>)	c.120
		Tipulidae	2
D	Very Pollution Tolerant	<i>Glossiphonia complanata</i>	1
E	Most Pollution Tolerant	Tubificidae	2
-	Taxa not assigned to any Indicator Group	<i>Eiseniella tetraedra</i>	1
		<i>Stylodrilus heringianus</i>	3
		Ceratopogonidae	2
		Dixidae	2

3.2.2.2. SITE B

The very small size of the water course at this site renders it less than optimal for Q-rating assessment. The invertebrate community recorded at this site and tabulated below merits a tentative Q-rating of Q1-2, indicating seriously polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None recorded	
B	Moderately Pollution Sensitive	None Recorded	
C	Moderately Pollution Tolerant	Planorbidae	6
		<i>Gammarus duebeni</i>	1
		Hydracarina	3
		Dytiscidae	18
		Chironomidae (excl. <i>Chironomus</i>)	6
D	Very Pollution Tolerant	<i>Glossiphonia sp.</i>	1
E	Most Pollution Tolerant	Tubificidae	36
		<i>Chironomus sp.</i>	117
-	Taxa not assigned to any Indicator Group	<i>Lumbriculus variegatus</i>	1
		Culicidae	1

3.2.2.3. SITE C

The very small size of the water course at this site renders it less than optimal for Q-rating assessment. The invertebrate community recorded at this site and tabulated below merits a tentative Q-rating of Q1-2, indicating seriously polluted conditions. Visual and olfactory evidence of oil contamination was observed at this site; however the invertebrate community is indicative of serious organic contamination.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None recorded	
B	Moderately Pollution Sensitive	None Recorded	
C	Moderately Pollution Tolerant	<i>Gammarus duebeni</i>	1
		Dytiscidae	1
		Hydrophilidae	1
		<i>Helophorus</i>	1
		Chironomidae (excl. <i>Chironomus</i>)	95
D	Very Pollution Tolerant	None Recorded	
E	Most Pollution Tolerant	Tubificidae	2
		<i>Chironomus</i> sp.	c.180
		<i>Eristalis</i>	5
-	Taxa not assigned to any Indicator Group	<i>Lumbriculus variegatus</i>	33

3.2.2.4. SITE D

The very small size of the water course at this site renders it less than optimal for Q-rating assessment. The invertebrate community recorded at this site and tabulated below merits a tentative Q-rating of Q1-2, indicating seriously polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None recorded	
B	Moderately Pollution Sensitive	None Recorded	
C	Moderately Pollution Tolerant	<i>Potamopyrgus antipodarum</i>	10
		<i>Gammarus duebeni</i>	1
		Dytiscidae	6
		<i>Helophorus</i>	5
		Hydrophilidae	2
		Chironomidae (excl. <i>Chironomus</i>)	23
D	Very Pollution Tolerant	Sphaeriidae	c.120
		<i>Lymnaea peregra</i>	1
		<i>Helobdella stagnalis</i>	2
E	Most Pollution Tolerant	Tubificidae	8
		<i>Chironomus</i> sp.	c.470
-	Taxa not assigned to any Indicator Group	<i>Lumbriculus variegatus</i>	4

3.2.2.5. SITE E

The invertebrate community recorded at this site and tabulated below merits a Q-rating of Q3, indicating moderately polluted conditions.

INDICATOR GROUP	POLLUTION SENSITIVITY/TOLERANCE	TAXON	NUMBER
A	Very Pollution Sensitive	None recorded	
B	Moderately Pollution Sensitive	Sericostomatidae	7
		<i>Leuctra sp.</i>	1
		<i>Ancylus fluviatilis</i>	7
C	Moderately Pollution Tolerant	<i>Potamopyrgus antipodarum</i>	75
		<i>Gammarus duebeni</i>	c.110
		<i>Baetis rhodani</i>	71
		Dytiscidae	8
		<i>Helophorus</i>	1
		Hydrophilidae (larva)	1
		Chironomidae (excl. <i>Chironomus</i>)	c.110
		Simuliidae	1
		Tipulidae	29
D	Very Pollution Tolerant	<i>Glossiphonia complanata</i>	1
		<i>Erpobdella</i>	1
		Sphaeriidae	3
E	Most Pollution Tolerant	Tubificidae	3
-	Taxa not assigned to any Indicator Group	<i>Eiseniella tetraedra</i>	4
		Ceratopogonidae	1

3.2.2.6. Overview of water quality in the Aghacureen Drain

The results of biological water quality assessment indicates that the Aghacureen drain is seriously polluted at the point where it enters the KWD Ltd. site (at Site C) as shown on Figure 1. The biological assessment further indicates that the drain is moderately or slightly polluted c.200m upstream of the site (Site A, Figure 1). Chemical assessment carried out by RPS-MCOS Ltd. (Appendix 2) indicates significant contamination upstream of the KWD Ltd. site (c. 70m downstream of Site A) with elevated COD, BOD, Iron and Manganese. However, elevated levels of ammonia and conductivity downstream of the KWD site (Site D), and the effluent observed at Grid Reference V9368 9396, indicate the likelihood of contamination from the site itself.

3.2.3. Fish

Site E was electrofished for 10 minutes. No fish of any species were recorded.

3.2.4. Protected Status and Protected Species

No protected species were recorded in the present survey. All three lamprey species (listed in Annex II of EU Habitats directive 92/43/EEC) are known to occur in the River Flesk catchment (Kurz and Costello, 1999). Lampreys could therefore occur in the Glanooragh river and tributaries. Salmon (listed in Annex II of EU Habitats directive 92/43/EEC) were recorded in the Glanooragh River during this survey and have been recorded by Central Fisheries Board in the wider Gweestin system (W. Roche pers. comm.) On the basis of habitat quality the possibility that salmon could use the lowest section of the Aghacureen drain as a spawning and nursery area, while unlikely, cannot be ruled out.

3.2.5. Importance of Potentially Affected Freshwater Habitats

The Aghacurreen Drain is classified as being of D Rating (moderate local value).

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