



N2 Monaghan to Emyvale Phase 2, 3 and 4

Freshwater Ecology and Bird Surveys

Date: 22 April 2011

FAO: Oliver Mulligan, Monaghan County Council

By: Billy Flynn, Flynn, Furney Environmental Consultants



Table of Contents

1. Introduction

1.1 Background

1.2 Objectives of Survey

1.3 Outline Description of Site under Survey

1.4 Outline Description of Proposed Works

1.5 Methodologies

Results

2.1 Freshwater Survey

2.1.1 Description of Sites

2.1.2 Rare, Threatened or Protected Species

2.2 Bird Survey

2.2.1 Species Recorded

2.2.2 Rare, Threatened or Protected Species

3. Discussion

3.1 Evaluation of Sites and Impacts upon Freshwater Habitats

3.2 Freshwater Habitats to be Impacted upon by Scheme

3.3 Possible Impacts upon Freshwater Habitats

3.4 Evaluation of Impacts on Bird Species and Habitats

4. Mitigation Measures

4.1 Freshwater Habitats

4.2 Bird Species

5. Conclusion and Recommendations

6. References

List of Appendices

Appendix A: Drawings

Appendix B: Species Lists

1. Introduction

1.1 Background

The following report details the findings of surveys carried out by Flynn, Furney Environmental Consultants on behalf of Monaghan County Council along the route of the proposed N2 Monaghan to Emyvale realignment. These works will include widening of the existing road, involving some additional landtake and the crossing of a number of small watercourses. Surveys were carried out in April 2011 in order to describe freshwater and bird habitat areas and advise on appropriate mitigation measures. The objectives of these surveys are given below.

1.2 Objectives of Survey

The objectives of the survey may be described as follows:

- To identify the presence or absence of key species such as eels, lamprey and kingfisher
- To identify and record important habitat types such as freshwater or nesting habitats
- To describe potential impacts upon these species by the proposed project
- To provide detailed mitigation measures
- To provide appropriate mapping and photographic records of findings

1.3 Outline Description of Site under Survey

The study site is located in north Co. Monaghan, north of Monaghan town. It extends from the townland of Coolkill some 3km north of Monaghan town to the village of Emyvale. The route is shown in the drawings in Appendix A. The vast majority of the landuse in the area is grazing and the adjoining lands are predominantly improved agricultural grassland. The topography of the site is typical of a drumlin landscape. An important feature of the area under survey is the frequency of well-maintained hedgerow boundaries. The vast majority of the field boundaries surveyed were hawthorn-dominated hedgerows which have been subject to management in recent years. As such, the majority of hedgerows were of the type described by Foulkes (2011) as the most commonly occurring in Monaghan. Ash was the most common tree appearing in hedgerows and in treelines as well as single trees. Beech trees in treelines were also found to be common particularly at the existing N2 roadside. Woodland is rare within the study area. Some small conifer plantations are found as well as a wooded garden. There is a single area of wet woodland at the southernmost point of the route, close to Griggy Lough.

The proposed route crosses 7 no. small watercourses. Although the route is within the catchments of the Monaghan Blackwater and The Mountain Water

Rivers, the route does not cross any major tributaries of these rivers. A single river is crossed by the route. This is the Tirnaneil River the upper stretch of which runs between Bellises Lough and Griggy Lough and is crossed by the existing N2. The lower section of this river flows in a southerly direction from Griggy Lough to the Blackwater. The river is crossed twice by the proposed alignment. The two river crossings are the subject of a previous report (on Phase I of this project) by Atkins (2010).

1.4 Outline Description of Proposed Works

The proposed N2 Monaghan to Emyvale Road Improvement scheme proposes to improve the existing N2 Dublin – Derry National Primary Road by widening the road cross-section, easing bends and undertaking localised minor realignments of the existing road in 4 phases. Phase 1 of the N2 Monaghan to Emyvale Road Improvement Works is currently under construction. The proposed road cross section will include an 8m road width, 2 no. 3m wide verges and associated embankments for cut and fill. Sight visibility splays will also have to be kept clear of obstructions at junctions and accesses. The current work surveys the lands made available (LMA) for Phase 2, 3 and 4 of the proposed N2 Monaghan to Emyvale Road Improvements works.

Phase 2 and 4 are contiguous sections of road, which together comprise a length of approximately 5.3km extending from the townland of Coolkill to the townland of Gortmoney at the settlement of Corracrin. Phase 3 extends from Gortmoney in the settlement of Corracrin to the village of Emyvale. The survey area extends from National Grid Co-Ordinate 267773,336475 to 267695, 343790. The overall length under survey is approximately 7.35km.

1.5 Methodologies

A desktop survey of mapping, aerial photography and species records was initially carried out. Databases held by the National Parks and Wildlife Service (NPWS) and The National Biodiversity Data Centre (NBDC) were consulted. Correspondence with Inland Fisheries Ireland and NPWS was also utilised. Surveys of watercourses followed guidelines given by the Environment Agency (2003). Habitats were identified, mapped and classified and dominant plant species noted in accordance with the guidelines given by the JNCC (2007) and The Heritage Council (2010). Habitats were classified as per Fossitt (2000). Assessment of ecological impact followed guidelines by IEEM (2006) and NRA (2006). Survey for protected species also followed guidelines given in NRA (2010).

2. Results

2.1 Freshwater Survey

All watercourses crossed by the proposed route were surveyed between 6th and 18th April 2011. In addition to this, any watercourses within 250m of the route were also surveyed for target species such as lamprey, white-clawed crayfish, kingfisher and otter. This was extended to 0.5km on some watercourses (e.g. the Mountain Water River) where deemed appropriate.

A previous study (Atkins, 2010) carried out detailed assessment of the Tirnaneil River, the majority of the length of which falls within Phase I of the project. However, as Phase II commences at the crossing of a portion of this river (between Bellises Lough and Griggy Lough), an assessment was carried out on this portion by the present authors. This river is described in this present work as Stream 1. The watercourses surveyed are shown graphically in the drawings in Appendix A and are described in the following section.

None of the sites surveyed fall under any conservation designation. There are no Natural Heritage Areas or Special Areas of Conservation within the proposed route. None of the watercourses surveyed have any direct connectivity with any designated sites. Details of designated sites close to the proposed route are given in an accompanying report.

2.1.1 Description of Sites

Stream 1 (Tirnaneil River - upper stretch).

This watercourse (FW2) drains Belisses Lough (circa 0.7km west of alignment) and flows in a north-easterly direction into Griggy Lough which is less than 0.1km east of the alignment. This stream was u-shaped within the section under survey. Flow was slow to moderate. The stream passes through improved agricultural grassland but also adjoins a mixed use agricultural and horticultural facility which includes mushroom farming. The stream is piped underground for a section downstream of this farm and passes through piped culverts under the existing N2. The stream then passes through a small area of grassland and waste ground before discharging into Griggy Lough, a small eutrophic lake. There is evidence of organic pollution within the stream. Some algal mats are seen in some slow-flowing areas to the west of the existing N2. Some filamentous algae was seen on the base of the stream immediately downstream of the culvert. Some foam was also seen. There were no instream macrophytes. The substrate was uniformly silt. There are 6 no. alders on the banks of the stream downstream of the N2. Upstream of this the channel is overhung with hawthorn, ash and sycamore. No macroinvertebrates were seen on the substratum. Water crickets were seen in some of the slower areas.

This section of the river is of no fisheries value at present given its apparently polluted condition. There is little or no potential for eels to utilise this channel. The stream has been modified for much of the stretch under survey resulting in straightened areas and poor bank vegetation. There is also evidence that a vehicle has tracked across this stream in recent months.

The River Habitat Survey (RHS) data for this stretch is given below.

Watercourse	Phase	Description
Tirnaneil River (Stream 1)	2	Morphology Channel Structure: U-shaped Banktop Height: 4m Bankfull Height: 3m Average Depth: 20cm Average Width: 1.5-1.8m Modifications: Straightening, bank clearance, pollution.
Habitat	Instream	Substrate: almost uniformly silt, some stones and concrete downstream of culvert . Macrophytes: None. Some algal mats and threads noted.
	Bank	Vegetation type: simple. Grasses dominant. Land use: Agricultural grassland, mushroom farming, unused ground.

Photographs



Stream 2 (unnamed stream)

This stream arises in the townland of Tirnaneil circa 0.25km west of the existing N2. The stream flows in a roughly southerly direction through agricultural lands before running alongside the existing N2 under which it is piped. The stream then passes between further agricultural grassland and some scrub before draining to Griggy Lough. Flow was noted as being slight in the upper stretches to none closer to Griggy Lough. The stream is joined by a number of drainage ditches. Although no flow was noted in these at time of survey, and some were completely dry, flow may well exist in higher rainfall conditions. There is evidence of some organic pollution in the upper section of this stream. This appears to be entering the stream from a drainage ditch which enters the river from the south in Tirnaneil. The stream is partially overhung with hawthorn and blackthorn hedgerow and semi-mature ash for much of the section to the west of the alignment although some field boundaries are without substantial vegetation here. Alongside the road, the vegetation over the stream is tightly cut hawthorn-dominated hedgerow. On the lower sections of the stream are more mature trees including ash and willow and these are found on both sides of the stream closer to Griggy Lough. The shallow depth of this stream and lack of flow conditions would indicate poor fishery potential though it may offer some cyprinid habitat. The stream is of no value for lamprey or salmonid species. No crayfish were found.

The River Habitat Survey (RHS) data for this stream are given below.

Watercourse	Phase	Description
Stream 2	2	Morphology Channel Structure: U-shaped Banktop Height: 1m Bankfull Height: 1m Average Depth: 20cm Average Width: 0.8m Modifications: straightened on last roadworks
Habitat	Instream	Substrate: Mostly silt with some cobble Macrophytes: None Fishery value: Limited
	Bank	Vegetation Type: Complex in areas with mature trees. Small area of scrub Landuse: Mostly agricultural grassland, roadside.

Photographs



Stream 3 (unnamed watercourse)

This is a very small watercourse which originates to the west of Drumcaw. The stream flows east toward the N2 under which it is diverted and then joins Stream 4. It is presumed that in higher rainfall conditions part of the flow from this stream would be diverted before the road crossing and flow in a northerly direction parallel to the existing N2. There was some standing water in this channel at time of survey but no flow was noted.

The substrate is a mixture of silt, cobbles and some gravels. Much of the stream is overhung with tightly cut hedgerow. There are some more mature trees at the upper section (west). However, most of the channel is very shaded and the vegetation on banks is limited. The small size and low flow levels of the stream would make this watercourse unlikely to be of suitable habitat for any fish species. There is a limited variety of substrate in this stream and few macroinvertebrates were seen. These were limited to freshwater shrimp (*Gammarus*) and cased caddis larvae of the family Glossosomatidae. RHS data for this stream are given below:

Watercourse	Phase	Description
Stream 3	2 - 4	Morphology Channel Structure: U-shaped Banktop Height: up to 1.2m Bankfull Height: 1m Average Depth: 10cm Average Width: 80cm Modifications: straightened at last roadworks
Habitat	Instream	Substrate: silt, cobble, gravel Macrophytes: none Fishery value: limited - none
	Bank	Vegetation Type: predominantly simple Landuse: agricultural grassland, road

Photographs

Stream 4 (Unnamed Stream)

This stream originates as a field drain at Legacurry and flows in a northerly direction. The stream flows along the eastern side of the existing N2 for over 1km, diverts away from the road at a garden at Cloghnart before once more flowing parallel to the N2 for several hundred metres. It diverges away from the road again at Corracrin where it joins Stream 6 (see below). The stream is overhung with roadside hedgerow for most of its length. The stream is lost from sight in some areas as it is completely overgrown with gorse, blackthorn, ash and honeysuckle. The poor light conditions lead to very poor macrophyte habitat. The stream has been partially canalised approaching its junction with Stream 6 (see below). The stream is fast-flowing for most of its length. Average depths were very shallow (all <10cm). Macroinvertebrate fauna was limited to *Gammarus duebeni* and Glossosotomid caddises which were highly abundant. This stream offers suitable habitat for species such as stickleback, which were noted, but not for salmonid species. RHS data for this stream are given below:

Watercourse	Phase	Description
Stream 4	2-4	Morphology Channel Structure: U-shaped Banktop Height: up to 1.5m Bankfull Height: Less than 1m Average Depth: 5-8cm Average Width: c. 0.9-1m Modifications: straightening, canalisation
Habitat	Instream	Substrate: Varied: silt-cobbles Macrophytes: None Fishery value: Limited
	Bank	Vegetation Type: dominated by hedgerow vegetation Landuse: agricultural grassland, road


Photographs



Stream 5 (Unnamed stream, tributary of Stream 4)

This watercourse arises in agricultural land in the townland of Knockronaghan to the west of the existing N2. The stream then flows in a rough easterly direction where it runs parallel to the N2 before crossing under the road via a double-piped culvert. The stream is lined with semi-mature willow to the west of the N2 but for most of its length there is little or no substantial vegetation with the exception of the roadside hedgerow. No fish were recorded in this stream although it would offer suitable habitat for species such as stickleback. The existing culvert may offer a barrier to upstream migration for several species. Flow was noted to be slow in several areas. This allowed pond-skaters and water-crickets to be found in some areas where the depth was up to 0.3m. *Gammarus duebeni* were occasionally seen. No salmonid habitat exists in this watercourse.

RHS data for this stream are given below:

Watercourse	Phase	Description
Stream 5	4	Morphology Channel Structure: U-shaped Banktop Height: up to 2m Bankfull Height: c. 1m Average Depth: 20cm Average Width: 1m Modifications: straightening, culverting
Habitat	Instream	Substrate: silt with some cobbles Macrophytes: None Fishery value: Limited
	Bank	Vegetation Type: mixed- semi-mature trees and hedgerow, grasses Landuse: agricultural grassland, road
Photographs		
		

Stream 6 (Unnamed stream)

This is a small but fast-flowing stream which arises south of the townland of Creevelea to the west of the existing N2. The stream flows in an easterly direction crosses beneath the N2 under a bridge where shortly after it is joined by Stream 4. It then continues to flow in an easterly direction being crossed by and then running roughly parallel to a local road. The stream has been canalised for a short section where a mill was located. The larger woody vegetation has been cleared from the stream in the field immediately to the east of the N2. The remaining vegetation includes cow parsley, grasses, nettle, meadowsweet and a small amount of bramble. There is a low concrete weir on this stretch. At the crossing under the N2 there is another weir. Above this, young alder and holly have been cut to around 1.2m in height. The maximum width of the channel is around 2m. with an average depth of 20cm. The substrate is mostly silt and there is much debris from tree-cutting. Macroinvertebrates seen were whirligig beetles and water crickets on the surface, a single leech, caddises of the Glossosotomidae family and many tubificid worms. Upstream of the crossing under the N2, flow is slower and there is more siltation visible. Larger caddises of the family Limnephilidae were seen here. The stream here is overhung by semi-mature to mature alders, some of these are in poor condition. The bankside vegetation here is relatively simple, dominated by grasses with some cow parsley and cuckoo flower. The banks are low (<0.5m) on average but stream depth is more uniform and deeper. There are no riffle areas. The stream may well support cyprinid species but none were seen. The stream offers little potential for lamprey or salmonids. RHS data for this stream are given below:

Watercourse	Phase	Description
Stream 6	4	Morphology Channel Structure: U-shaped Banktop Height: 2m Bankfull Height: 2m Average Depth: 20cm Average Width: 1.8m Modifications: straightening, canalisation, vegetation removal, weirs, mill wheels
Habitat	Instream	Substrate: mostly silt Macrophytes: none Fishery value: limited but has salmonid potential
	Bank	Vegetation Type: Complex (but most woody plants cut) Landuse: Agricultural grassland, road, woodland



(Stream 6 continued)

Photographs**Stream 7 (Unnamed stream)**

This is one of the more substantial streams crossed by the route. This stream arises from a stream draining Grove Lough at Cornacreve to the west of the route which joins another watercourse c. 200m west of the N2. This passes under the alignment at Hoof Bridge in Phase 3 of the scheme. The stream then flows in a south-easterly direction to drain into Tully Lough circa 200m west of the N2 at Tully. The stream is overhung with mature trees for much of its length. To the east of the route (leading to Tully L.) there is a double treeline of young alder. On the other side of the alignment there is a mixture of young alder and ash though only on the southern side of the stream. Bank vegetation is complex (more than 10 no. species) including lesser celandine, arum, grasses, docks, dandelion, opposite-leaved golden saxifrage and ivy at ground level. There is bramble, honeysuckle young hawthorn and ivy in the understorey. A substantial number of macroinvertebrates were noted, including cased caddis (Limnephilidae and many Glossosotomidae) and *G. duebeni*. However, no mayfly or stonefly larvae were found. It is unlikely that this stream offers any potential for salmonid or lamprey habitat. This watercourse was seen to have a mixed substrate from some limited silt areas to a predominance of cobbles. Most of the area under survey was riffle. This stream would be suitable habitat for white-clawed crayfish. However, despite intensive survey of this stream, none were found. RHS data for this stream are given below:

Watercourse	Phase	Description
Stream		Morphology Channel Structure: U-shaped Banktop Height: 2m Bankfull Height: c. 1m Average Depth: 15cm Average Width: 1.7m Modifications: Culvert (under N2)

(RHS Data: Stream 7 continued)

Habitat	Instream	Substrate: predominantly cobble Macrophytes: none Fishery value: cyprinid, crayfish potential
	Bank	Vegetation Type: complex Landuse: agricultural grassland, road
Photographs		
		

2.1.2 Rare, Threatened or Protected Species

a. Lamprey: There are three species of lamprey known to occur in Ireland. These are Sea Lamprey, River Lamprey and Brook Lamprey. All three species appear on Annex II of the EU 'Habitats' Directive (1997). It is likely that river and brook lamprey occur within the River Blackwater and Mountain Water catchments (Igoe et al., 2004) although there are no specific records for these (Kurz & Costelloe, 1999). No suitable habitat for Lamprey species was found during the survey. Of the watercourses crossed by the route, Stream 6 appears to offer the most potential habitat for brook lamprey.

b. Kingfisher: The kingfisher is a species listed under Annex I of the EU 'Birds' Directive (1979). The species is 'amber listed' as a bird of medium conservation concern by Lynas et. (2007). No evidence of kingfisher nesting or other activity was found during this survey. Kingfishers have been seen on the Mountain Water River and at Stream 7 (Pers. Comm¹) and are likely to be common within the Blackwater catchment.

c. Crayfish: The white-clawed crayfish is a protected species which is listed in Annexes II and V of the 'Habitats' Directive. This species is known to occur in this area (Demers et al., 2005; NBDC) and was recorded in a previous study for this project (Atkins, 2010). Correspondence with IFI confirmed that this species exists in the area under study. The Monaghan County Council Biodiversity Plan (2007) describes this species as 'fairly widespread'. Although suitable habitat for crayfish exists in some of the watercourses crossed by the route, none were found during this survey. The watercourses most likely to offer suitable habitat are Streams 1 (Tiraneil River) and 7. However, water quality was seen to be very poor in the Tiraneil River and would therefore make this unsuitable crayfish habitat. Water quality is higher (estimated Q2-Q3) in Stream 7 and would make this more suitable habitat. Tully Lough would also offer suitable habitat.

d. Common Frog: This species is protected under the Wildlife Acts (1976 and 2000) as is its breeding places. Tadpoles of the common frog were found in only 1 no. location within 150m of the route. This was at Griggy Lough. The species is known to be widespread in Monaghan (Barron, 2006).

e. Salmonid (fish) species: No suitable salmonid habitat was found to be within the area under survey.

f. Coarse fish species: Stickleback was the only fish species recorded during the survey. However, good stocks of several species are known from several lakes within the catchment.

¹ Pers Comm: Landowner to fieldworker, 8 April 2011- The reported record from Stream 7 was from "some years ago".

2.2 Bird Survey

All birds seen or heard during the course of the survey were recorded. Birds were recorded within and over the study site. Birds outside the site that could be recognised by sight or song / call were also recorded. Specific bird nesting habitats were recorded where possible. In addition to this, bird-song counts were carried out shortly after dawn on 18 April to listen for species which may not have been heard during survey hours. Approximately 30 minute counts were held in each of the project phases areas at Tirnaneil, Drumcaw and Tully. Bird habitat such as rookeries and scrub were recorded and are shown in the drawings in Appendix A.

2.2.1 Species Recorded

Scientific name	Common name	Resident/ Visitor	BOCCI Status*
<i>Acrocephalus schoenobaenus</i>	Sedge warbler	V	G
<i>Anas crecca</i>	Teal	V	A
<i>Anas platyrhynchos</i>	Mallard	R	G
<i>Apus apus</i>	Swift	V	A
<i>Buteo buteo</i>	Common buzzard	R	G
<i>Carduelis carduelis</i>	Goldfinch	V	G
<i>Columba palumbus</i>	Wood pigeon	R	G
<i>Corvus corax</i>	Raven	R	G
<i>Corvus corvus</i>	Grey crow	R	G
<i>Corvus frugilegus</i>	Rook	R	G
<i>Corvus monedula</i>	Jackdaw	R	G
<i>Erithacus rubecula</i>	Robin	R	G
<i>Fringilla coelebs</i>	Chaffinch	R	G
<i>Gallinago gallinago</i>	Snipe	R	A
<i>Gallinula chloropus</i>	Moorhen	R	G
<i>Hirundo rustica</i>	Barn swallow	V	A
<i>Motacilla cinerea</i>	Grey wagtail	R	G
<i>Parus ater hibernicus</i>	Coal tit	R	G
<i>Parus caeruleus</i>	Blue tit	R	G
<i>Parus major</i>	Great tit	R	G
<i>Passer montanus</i>	Tree sparrow	R	A
<i>Phasianus colchicus</i>	Pheasant	R	G
<i>Pica pica</i>	Magpie	R	G
<i>Pyrhulla pyrhulla</i>	Bullfinch	R	G
<i>Sturnus vulgaris</i>	Starling	R	A
<i>Sylvia atricapilla</i>	Black-cap	V	G
<i>Troglodytes troglodytes</i>	Wren	R	G
<i>Turdus merula</i>	Blackbird	R	G
<i>Turdus philomelus</i>	Song thrush	R	G
<i>Vanellus vanellus</i>	Lapwing (green plover)	R	R

* Status as per Lynas et al. (2007). i.e. as being 'Red (R), Amber (A) or Green (G)' of respectively high, medium or low conservation concern.

Of the 31 no. species recorded, 25 are resident and 6 are summer visitors.

2.2.2 Rare, Threatened or Protected Species

Of the 31 no. species recorded, 6 no. are on the 'Amber' list of birds of conservation concern in Ireland (Lynas et al., 2007). These are: teal, swift, starling, barn swallow, tree sparrow and snipe. A single species - lapwing- is on the 'Red' list and the remainder are on the 'Green' list. No other endangered species were recorded. No kingfisher were recorded during survey.

3. Discussion

3.1 Evaluation of Sites and Impacts upon Freshwater Habitats

The impacts which may be expected from the proposed works are described below. These possible impacts have been assessed under the National Roads Authority guidelines (NRA, 2006). These provides guidance on assessing impact significance upon aspects of sites proposed for works. The site evaluation scheme of these guidelines would categorise the majority of the freshwater sites as Rating D: *Local Importance: higher value*². While sites of higher ecological value such as the River Blackwater and Emy Lough may be described as Rating B: *Nationally Important*, these sites are not directly connected to any of the freshwater sites crossed or affected by the proposed works. Conversely, some of the sites crossed would have poorer freshwater status than described in the qualifying criteria for site importance (see footnote). However, to adopt a precautionary approach, all of the freshwater sites crossed may be given the Rating of D. The rating of these and other sites is given below:

Site	Habitat Type	Rating
Belisses Lough	Eutrophic Lake	D: Local Importance: higher value
Stream 1 (Tirnaneil River - upper stretch).	River	D: Local Importance: higher value
Griggy Lough	Eutrophic Lake	D: Local Importance: higher value
Streams 2-7	Streams	D: Local Importance: higher value
Tully Lough	Mesotrophic Lake	D: Local Importance: higher value
Emy Lough	Mesotrophic Lake	B: National Importance
Mountain Water River	River	C: County Importance

The significance of impacts upon a D category aquatic site are classified as follows:

Scale/Duration	Temporary	Short-term	Medium-term	Long-term
Extensive	Minor	Minor	Moderate	Moderate
Localised	Not significant	Minor	Minor	Minor

(After NRA, 2006)

² Category D sites are: containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; or Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value (NRA, 2009).

In line with the EPA Guidelines (EPA 2002), the following terms are defined when quantifying duration:

- Temporary: up to 1 year
- Short-term: from 1-7 years
- Medium-term: 7-15 years
- Long-term: 15-60 years
- Permanent: over 60 years

Localised impacts on rivers are loosely defined (NRA, 2006) as impacts measurable no more than 250m 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.

Likelihood of impact is defined in accordance with IEEM's *Guidelines for Ecological Impact Assessment* (2006):

- Almost Certain: probability estimated at greater than 95%
- Probable / Likely: probability estimated between 50% and 95%
- Unlikely: probability estimated between 5% and 50%
- Extremely Unlikely: probability estimated at less than 5%

3.2 Freshwater Habitats to be Impacted upon by Scheme

It is proposed that the re-alignment of the N2 will cross 7 no. watercourses and will also require the re-alignment of a number of these. In addition to this, the route passes in close proximity (<100m) to a lake (Griggy Lough) and within 200m of 2 no. other lakes: Bellises Lough, Tully Lough. Only one lake within 5km of the route is under designation. This is Emy Lough, a proposed Natural Heritage Area and statutory Wildfowl Sanctuary.

The following details watercourses and other freshwater habitats which may be impacted upon by the scheme and details possible impact of works.

Site	Rating	Likelihood of Impact	Significance of Impact
Belisses Lough	C	Extremely Unlikely	Not significant
Stream 1 (Tirnaneil River - upper stretch).	D	Almost certain	Minor
Griggy Lough	C	Unlikely	Minor
Streams 2-7	D	Almost certain	Minor
Tully Lough	C	Unlikely	Minor
Emy Lough	B	Extremely Unlikely	Not significant
Mountain Water River	C	Extremely Unlikely	Not significant

The above table concludes that there will almost certainly be impacts of minor significance on Streams 1 - 7. Impacts of minor significance upon Griggy and Tully Lough are rated as unlikely. These impacts are discussed in Section 3.3 (below). No impacts of any significance are predicted for the remaining sites.

3.3 Possible Impacts upon Freshwater Habitats

The most significant impacts upon the freshwater sites may be listed as follows:

- Watercourse bank-side vegetation and habitat loss and disturbance during works
- Loss of riparian habitat during channel realignment
- Direct impact upon protected freshwater species such as lamprey and white-clawed crayfish during stream realignment
- Loss of breeding habitat of the common frog
- Indirect impacts to the above species from siltation or other pollution (e.g. fuel, hydraulic fluids, lubricants or concrete) which may occur during culvert construction or channel realignment.

All of the above may be described as minor significance of temporary duration.

Residual impacts from loss of bankside and riparian habitat may be expected. These may be described as of minor significance of short-term duration.

The above impacts may be mitigated by the measures described in Section 4.1 (below)

3.4 Evaluation of Impacts on Bird Species and Habitats

The main impact to birds from the proposed works will be loss of habitat. The majority of this habitat is hedgerow and mature trees. A much less significant amount of grassland will be lost during works. A number of rookeries will be lost or otherwise impacted upon during works (See Appendix A). There will also be impact upon bird species from disturbance during construction, including noise and vibration. Some residual impacts may be expected from loss of habitat. These possible impacts have been assessed under the National Roads Authority guidelines (NRA, 2006). These provides guidance on assessing impact significance upon aspects of sites proposed for works. Guidelines by IEEM (2006) on assessing likelihood of impacts were also used.

The direct loss of habitat by the project, in particular hedgerows, mature trees, treelines and some small plantation areas is predicted to be a minor negative of permanent duration.

Disturbance to bird species from noise and vibration during construction has been assessed as being minor negative of temporary duration.

Residual impacts from loss of habitat such as riparian zones or scrub are predicted as being minor negative of long-term duration.

Measures to mitigate against these impacts are described in the following section.

4. Mitigation Measures

4.1 Freshwater Habitats

Best practice guidelines by the National Roads Authority (2006) for national road schemes crossing watercourses should be followed. These give specific directions with regard to works and design. In particular, culvert design specifications should be followed.

The guidelines by the Eastern Regional Fisheries Board (2005) should also be used for planning of works and culvert and fish passage design.

Consultation with Inland Fisheries Ireland (IFI) should be held on the design of any watercourse crossings. IFI have already expressed preference for the use of clear-span bridges over culverts. If culverts are to be used, the design for these must be carried out in consultation with IFI on a case-by-case basis.

IFI have also expressed their preference for the realignment of any extensive lengths of river or watercourse channel over culverting. The new channels should display hydraulic and morphological characteristic fulfilling the requirements of fisheries habitats. Bed and bank works should be executed in natural materials.

IFI have also stated that:

- Instream works in any salmonid catchments should take place between May and September.
- In the event of any waters containing lamprey, NPWS must be contacted.
- No instream works shall be carried out without written approval of IFI
- There must be no discharge of suspended solids or any other deleterious material to watercourses
- Fish passage conditions must be maintained at all times.

The design, material use, timing and sequence of channel closures and realignments / culverting must be agreed in advance with IFI.

At all times, area of works at water crossings or on banksides is to be limited.

Initial works crossing watercourses should be supervised by an approved ecologist when setting out the site.

It is recommended that a survey for white-clawed crayfish be carried out at Stream 7 prior to the commencement of works.

It is recommended that stream 6 is surveyed for brook lamprey prior to the commencement of works.

It is recommended that any slow-moving or still-water areas are surveyed for spawn or tadpoles of the common frog if works coincide with the breeding season of this species. If found, these must be moved under licence by qualified personnel. Pools may be created within the lands made available to compensate for any loss of breeding habitat.

Residual impacts arising from the loss of riparian or bankside vegetation may be mitigated against by the replacement of native vegetation and the use of native species in landscape measures. It is recommended that an ecologist is consulted in the drawing up of a landscape plan for this project.

It is recommended that physiochemical water quality sampling takes place prior to the commencement of works to establish baseline conditions. Field monitoring should take place during construction.

It is highly recommended that an environmental operating plan be drawn up for the site in accordance with guidelines given by the NRA (2009). This plan should be drawn up using guidelines given by CIRIA (Murnane et al., 2006) in order to minimise pollution risks from site.

Specific mitigation measures for watercourse protection during site works have been detailed in a report issued by Atkins (2010 - Appendix C). These should be implemented during works on this present project.

4.2 Bird Species

The following mitigation measures are recommended to minimise impacts upon bird populations.

- Works involving the removal of any woody vegetation or site clearance shall take place outside the bird nesting season (May-August inclusive).
- Any tree-felling or scrub-clearance carried out within the nesting season should be supervised by an ecologist. Known nesting sites such as rookeries should not be impacted upon during this time.
- Clearance works shall be strictly limited. Sites should be clearly marked out prior to clearance. Scrub and riparian areas should be protected from clearance where possible.
- Selective cutting and pruning should be used in preference to clearance if possible. This is particularly important for riparian trees.
- Machinery noise should be limited close to any of the lakes.

5. Conclusion and Recommendations

The main conclusions of the surveys may be summarised as follows:

- The proposed realignment of the N2 will cross a total of 7 no. watercourses. None of these watercourses were found to be of salmonid standard.
- None of the watercourses crossed are under any statutory designation. The nearest designated site is Emy Lough pNHA which is 1.15km north of the most northerly part of the route.
- The route passes within 250m of three lakes. None of these lakes are under any designation. The route crosses three watercourses which discharge into these lakes as well as one tributary of the Mountain Water River, a known trout river.
- Although freshwater crayfish are known in this catchment and in that of the Blackwater, none were found during this survey. No suitable habitat for lamprey was found.
- Two suspected incidences of pollution were noted. Both of these were of agricultural origin.
- 31 bird species were recorded during fieldwork. The majority of these are typical birds of farmland, hedgerow and woodland. Some birds of wetland were found.
- The majority of birds recorded are of low conservation concern although a single 'red-listed' species (Lapwing) was recorded.
- Several rookeries were recorded within the lands made available for this project

The main recommendations arising from these surveys may be summarised as follows:

- Best practice guidelines for works crossing watercourses by the National Roads Authority and the Eastern Regional Fisheries Board should be followed for planning and design of works at all watercourse crossings and realignments.
- Guidelines by CIRIA (UK) should be used for the maintenance of best practice on site and for protection of watercourses during works.

- Realignment of watercourses is to be preferred over culverts
- Works are to be carried out in consultation with Inland Fisheries Ireland with particular regard to structure design and instream works.
- Works within 'closed' seasons for watercourses are to be avoided where possible.
- Streams 6 and 7 are to be surveyed for brook lamprey and crayfish respectively before construction works.
- Trees, hedgerows and other woody vegetation should not be cleared during the bird nesting season.
- Clearance is to be strictly limited and damage to any areas of scrub is to be avoided where possible. Pruning and cutting should be used in preference to site clearance.

6. References

Atkins (2010) N2 Monaghan to Tirnaneill Road Realignment Monaghan County Council: Freshwater Ecology and Bird Surveys. Report for Monaghan County Council by Atkins, Dublin.

Aulio-Wann & Associates (2007) *Local Biodiversity Action Plan for County Monaghan (Final Draft)*. Report for Monaghan County Council

Barron, S. (2006) *County Monaghan Wetland Survey*. BEC Consultants Ltd for Monaghan County Council

Curtis, T.G.F. & McGough, H.N. (1988) *The Irish Red Data Book 1: Vascular Plants*. The Stationery Office, Dublin.

Demers, A., Lucey, J., McGarrigle, M.L. and Reynolds, J.D. (2005). The distribution of the white-clawed crayfish, *Austropotamobius pallipes*, in Ireland. *Biology and the Environment: Proceedings of the Royal Irish Academy* 105B, 65-69.

Eastern Regional Fisheries Board (2005) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*. Fisheries Protection Guidelines ERFB, Blackrock.

Environment Agency (2003). *River Habitat Survey in Britain and Ireland. Field Survey Guidance. Manual: 2003 Version*. EA, SEPA, Environment and Heritage Service

Fossitt, J.A (2000) *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Foulkes, N. (2010) *Hedgerow Survey of County Monaghan*. Report for Monaghan County Council Heritage Office.

Heritage Council (2010) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council, Kilkenny.

Igoe, F., Quigley, D.T.G., Marnell, F., Meskell, E., O'Connor W. and Byrne, C. (2004) *The Sea Lamprey *Petromyzon Marinus* (L.), River Lamprey *Lampetra Fluviatilis* (L.) And Brook Lamprey *Lampetra Planeri* (Bloch) In Ireland: General Biology, Ecology, Distribution And Status With Recommendations For Conservation*. *Biology And Environment: Proceedings Of The Royal Irish Academy*, Vol. 104B, NO. 3, 43 - 56 (2004)

Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom*. IEEM, London.

JNCC (2007) *Handbook for Phase 1 Habitat Survey*. Joint Nature Conservation Committee, Peterborough, UK.

Keely, B. (2010) *A Mammal Assessment of the Proposed Realignment of the N2 north of Monaghan Town at Tirnaneil*. Report for Monaghan County Council. August 2010.

Kurz, I. and Costello, M. J. (1999). *An outline of the biology, distribution and conservation of lampreys in Ireland. Irish Wildlife Manuals No. 5. Dúchas, the Heritage Service, Dublin.*

Lynas, P., Newton, Stephen F. & Robinson, J.A. (2007) *The Status of Birds in Ireland, an analysis of conservation concern 2008-2013. Irish Birds 8: 149-167*

Marnell, F., Kingston, N. & Looney, D. (2009). *Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.*

Murnane, E., Heap, A. & Nuttall (2006) *Control of Water Pollution from Linear Construction Sites. CIRIA Guidance Book No. C648. CIRIA, London*

National Roads Authority (2005). *Guidelines For The Treatment of Otters Prior To The Construction Of National Road Schemes. NRA, Dublin.*

National Roads Authority (2005). *Guidelines For The Crossing Of Watercourses During The Construction Of National Roads Schemes. NRA, Dublin*

National Roads Authority (2006). *Guidelines For The Assessment of Ecological Impacts Of National Road Schemes. NRA, Dublin.*

NRA (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2. National Roads Authority, Dublin.*

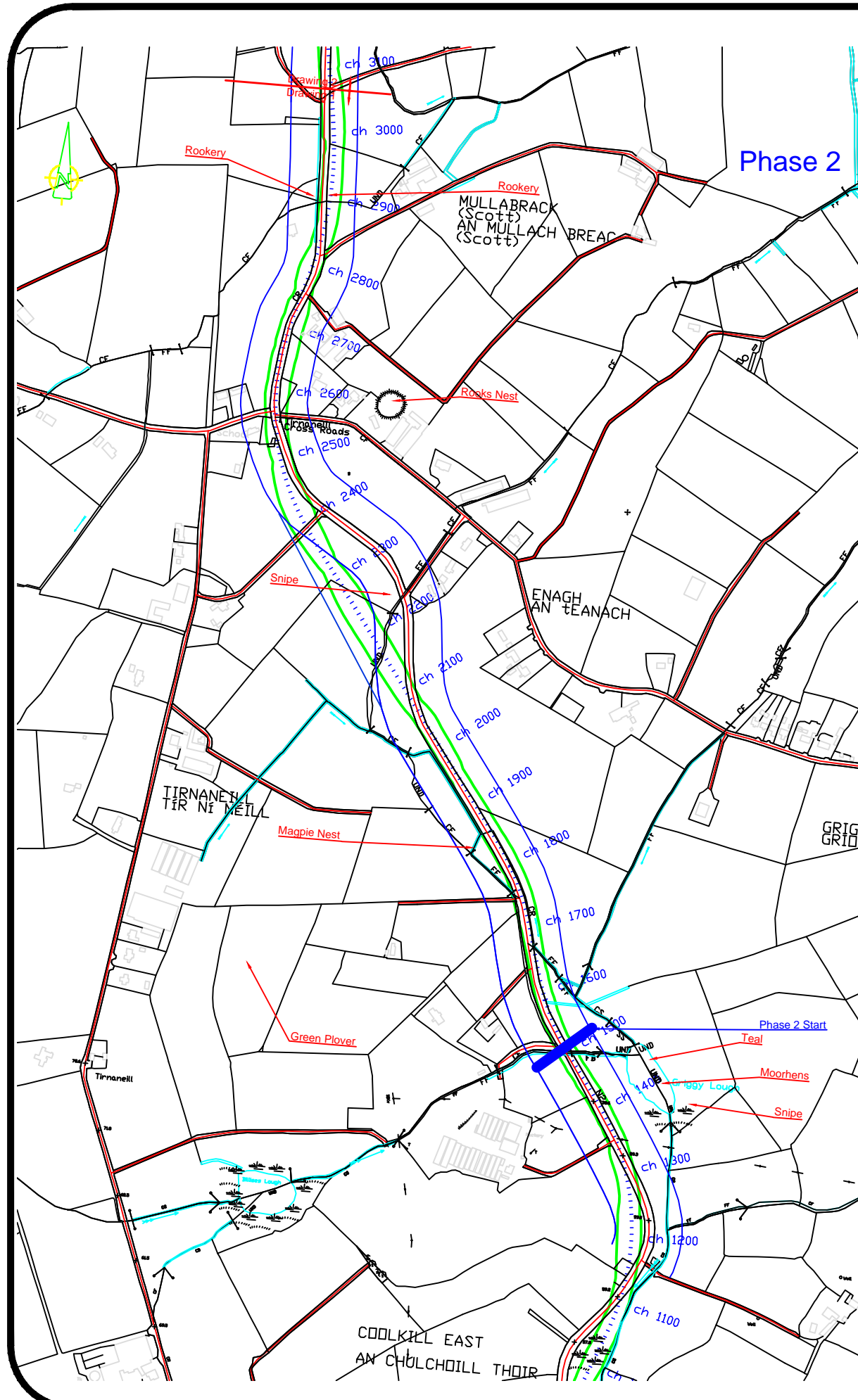
National Roads Authority (2010). *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes NRA, Dublin.*

Scannell, M J P and Synott, D M, 1987, *Census Catalogue of the Flora of Ireland. Stationary Office, Dublin*

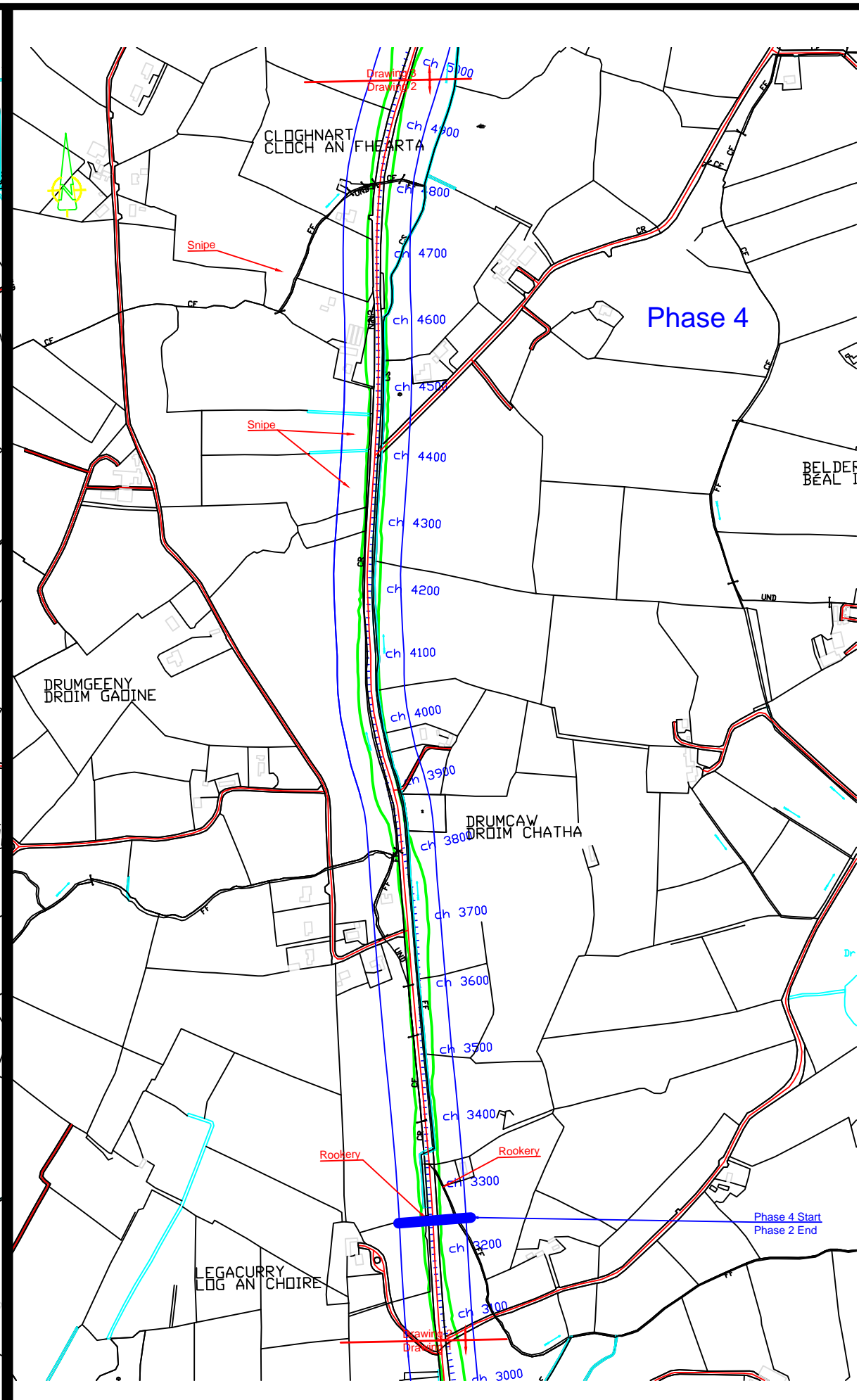
Webb, D.A., Parnell, J., & Doogue, D. (1996) *An Irish Flora Dundalgan Press, Dundalk.*

Appendix A: Freshwater and Bird Survey Drawings

Freshwater/Bird	N2-3-01
Drawing Nos.	N2-3-02
	N2-3-03
	N2-3-04



Drawing - A



Drawing - B

Flynn, Furney.

Client:

Monaghan County Council
 Oí (@) / Oí) @ ^ ^ @ @ @

General Notes / Legend

- 50m Offset
- Landtake

Flynn Furney Environmental Consultants Ltd
www.flynnfurney.com

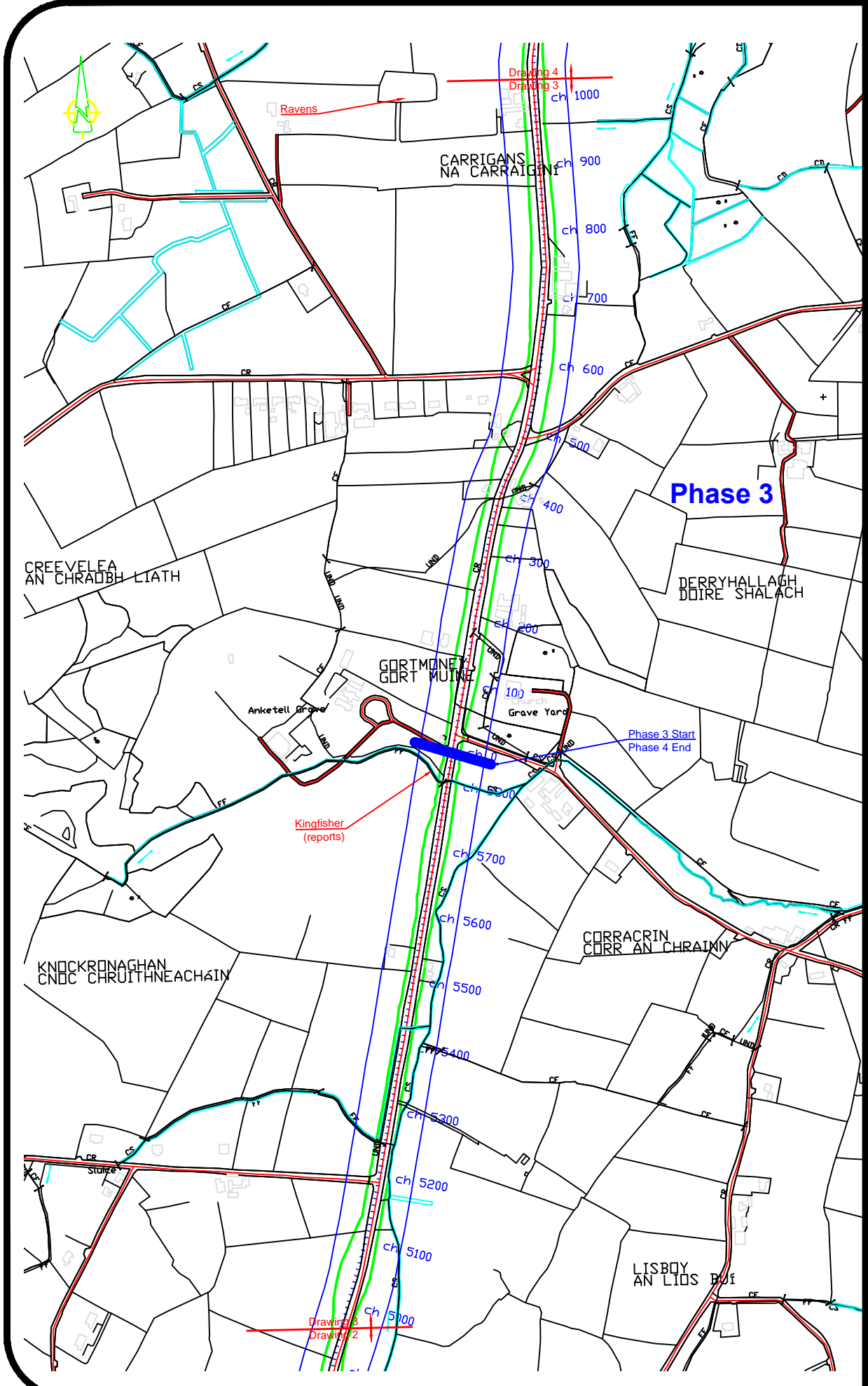
Project Name and Address

N2 Realignment
 Phase 2,4 and 3
 Ecology Drawings

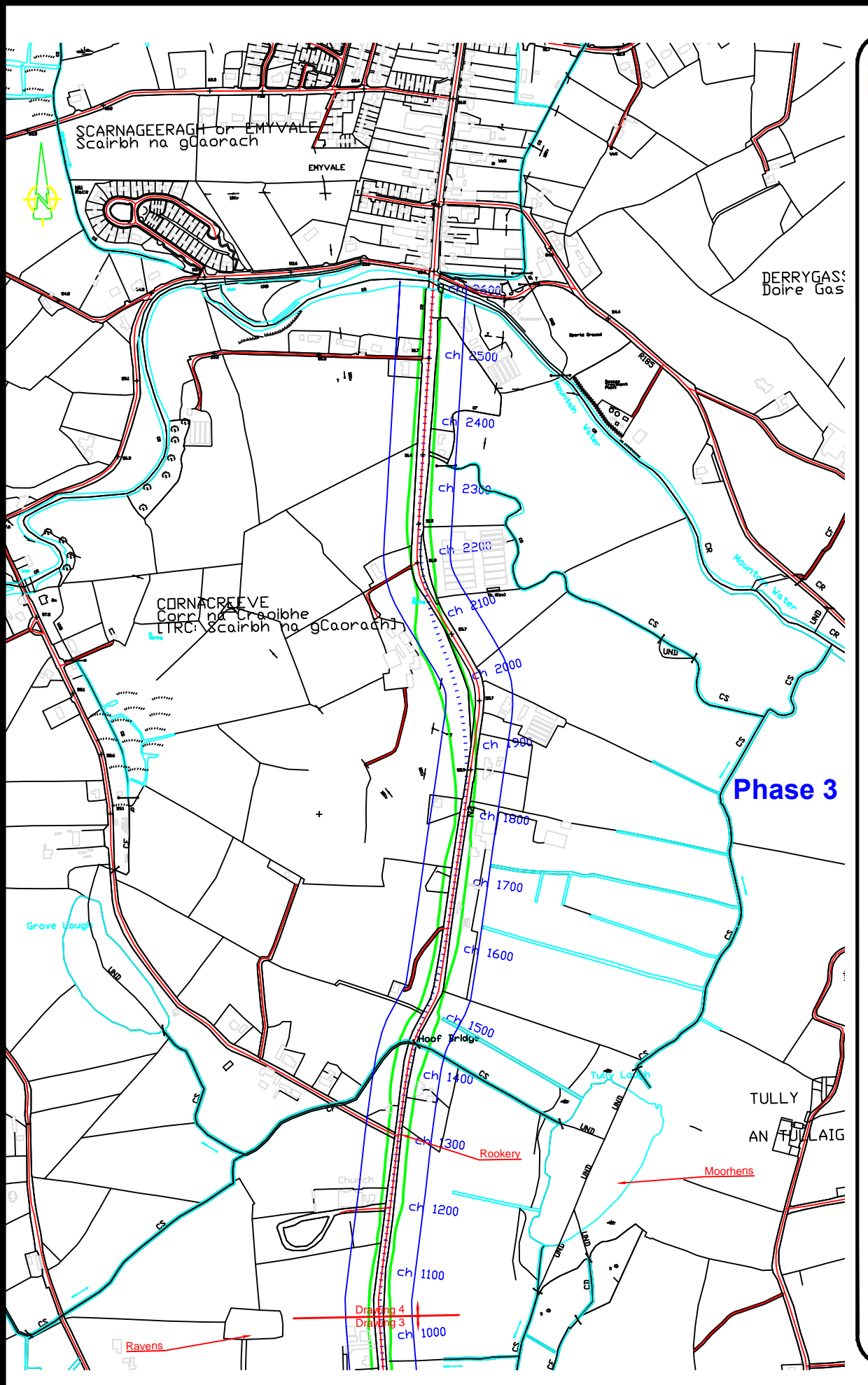
Avian

Drawing No.	N2-3-01	
2	Rev A	29.4.11
No.	Revision/Issue	Date

Project	N2	Sheet Set
Date	29.04.2011	01/04
Approx. Scale	1:4000 in A1	




Drawing - C



Drawing - D

Flynn, Furney.

Client:



Monaghan County Council
 Oí (@á^ÁDí) ce^Á @ á^á@ @ á

General Notes / Legend

- 50m Offset
- Landtake

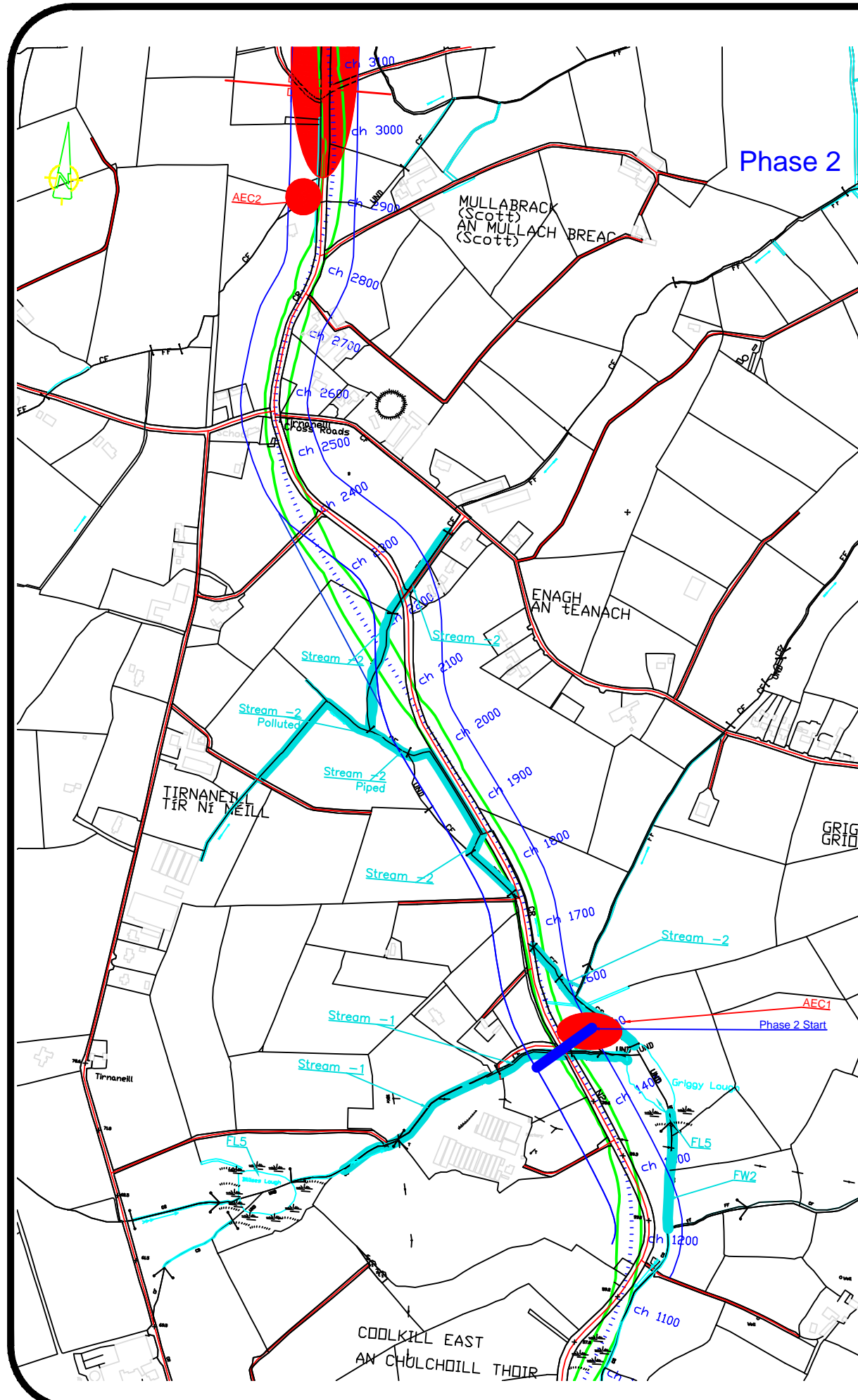
Flynn Furney Environmental Consultants Ltd
www.flynnfurney.com

Project Name and Address
 N2 Realignment Phase 2,4 and 3 Ecology Drawings

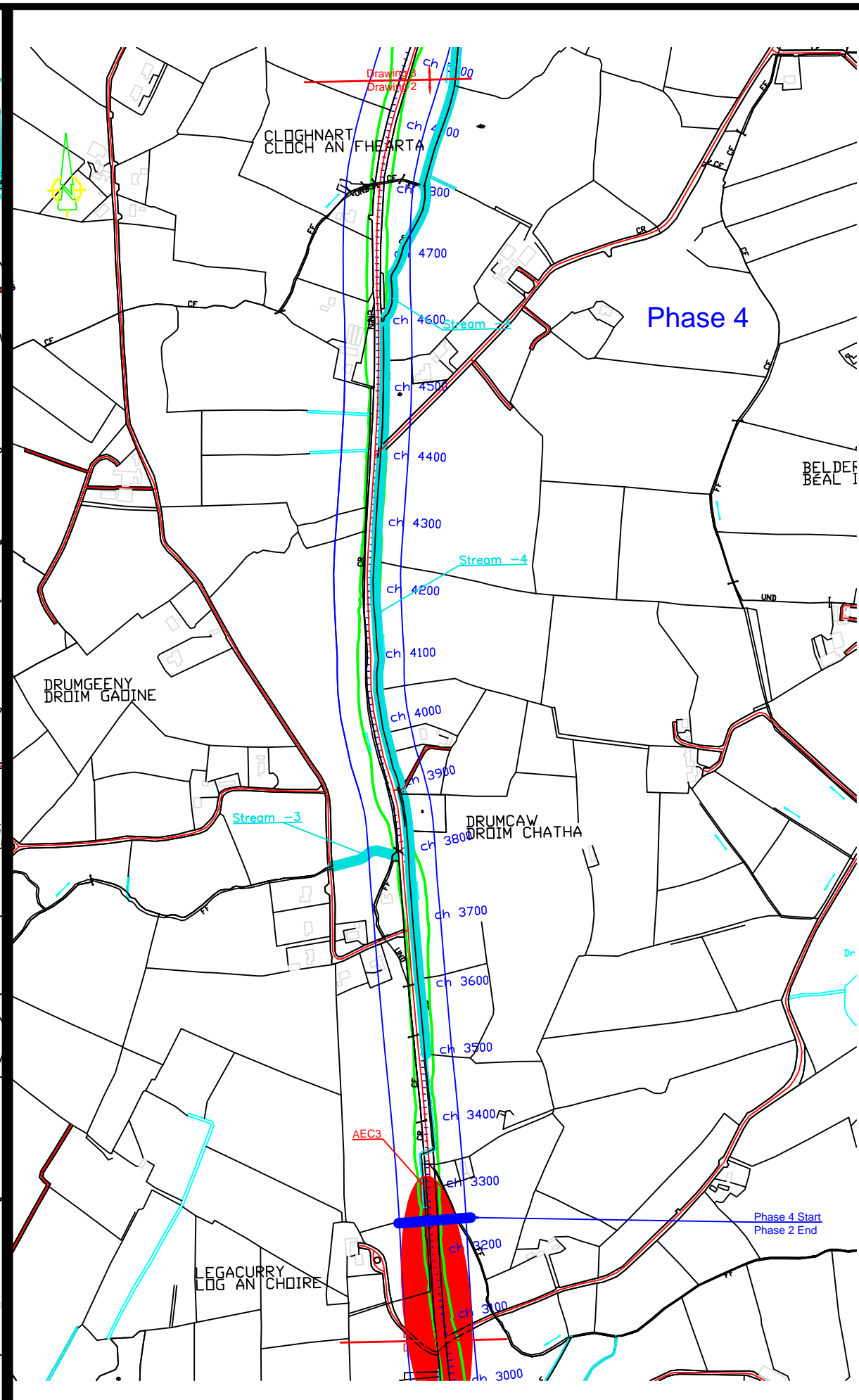
Avian

Drawing No. N2-3-02		
2	Rev A	29.4.11
No.	Revision/Issue	Date

Project N2	Sheet Set
Date 29.04.2011	02/04
Approx Scale 1:4000 in A1	



Drawing - A



Drawing - B

Client:



Monaghan County Council

Monaghan County Council
 Oí (@a^A0[) ce^A @ a^a@a@a

General Notes / Legend

- FL4 Mesotrophic Lakes
- FL5 Eutrophic Lakes
- FW1 Eroding/Upland Rivers
- FW2 Depositing/Lowland Rivers
- AEC Area of Ecological Constraint

Flynn Furney
 Environmental
 Consultants Ltd
www.flynnfurney.com

Project Name and Address

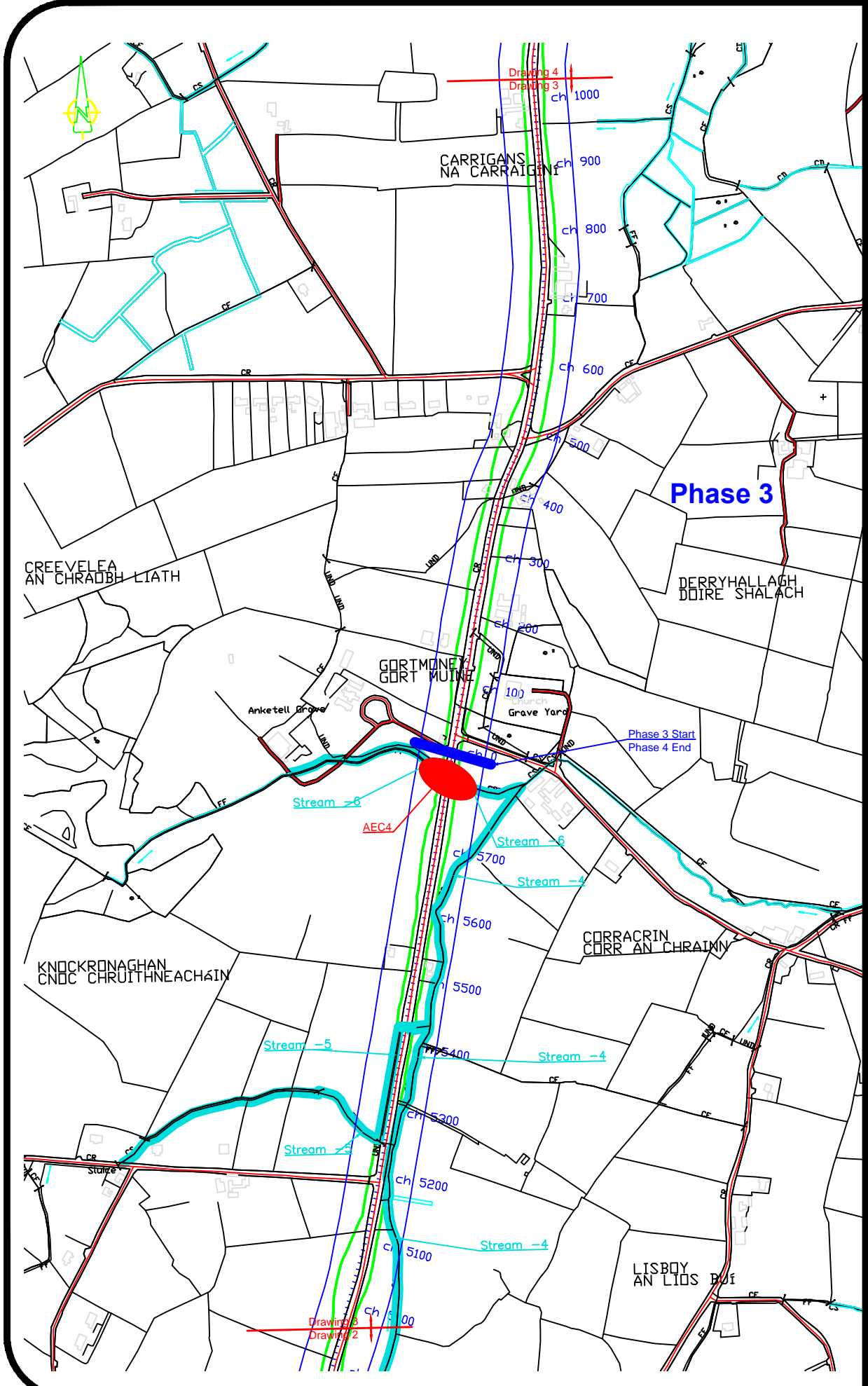
N2 Realignment
 Phase 2,4 and 3
 Ecology Drawings

Freshwater

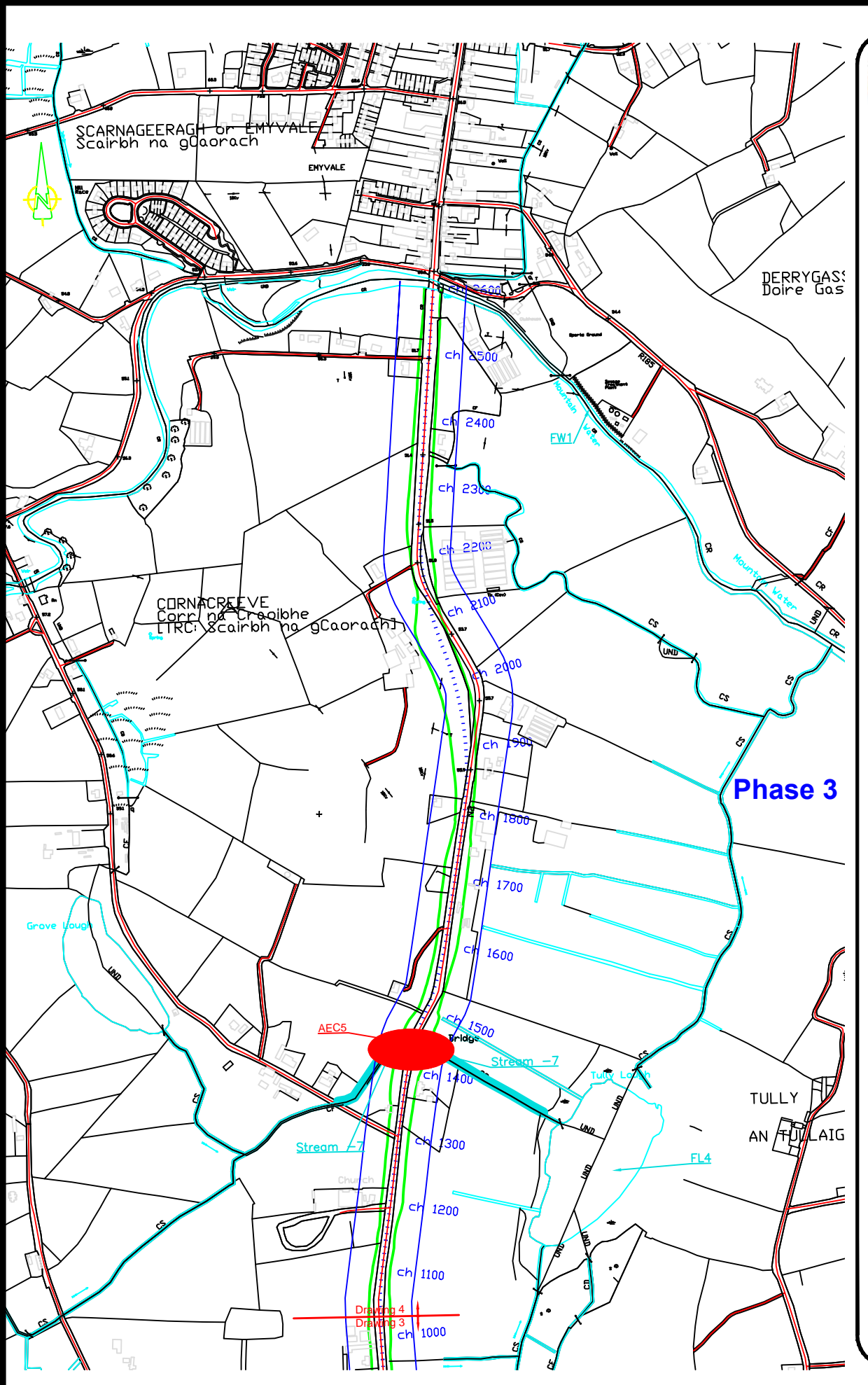
Drawing No. N2-3-03

2	Rev A	29.4.11
No.	Revision/Issue	Date

Project	N2	Sheet Set
Date	29.04.2011	03/04
Approx. Scale	1:4000 in A1	



Drawing - C



Drawing - D

Flynn, Furney.

Client:

Monaghan County Council
 Oí (@) ^ ^ @ ^ ^ @ ^ ^

General Notes / Legend

- Blue line
- Green line

Flynn Furney Environmental Consultants Ltd
www.flynnfurney.com

Project Name and Address

N2 Realignment Phase 2,4 and 3 Ecology Drawings

Freshwater

Drawing No. N2-3-04		
2	Rev A	29.4.11
No.	Revision/Issue	Date

Project	N2	Sheet Set
Date	29.04.2011	04/04
Approx Scale 1:4000 in A1		

Appendix B: Species Names

1. Plant Species

Name	Common Name
<i>Acer pseudoplatanus</i>	Sycamore
<i>Acer pseudoplatanus</i>	Sycamore
<i>Alnus glutinosa</i>	Alder
<i>Arum maculatum</i>	Arum
<i>Cardamine pratensis</i>	Cuckoo flower
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved golden saxifrage
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Fagus sylvatica</i>	Beech
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fraxinus excelsior</i>	Ash
<i>Hedera helix</i>	Ivy
<i>Hedera helix</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Ilex aquifolium</i>	Holly
<i>Ligustrum vulgare</i>	Privet
<i>Prunus spinosa</i>	Blackthorn
<i>Ranunculus ficaria</i>	Lesser celandine
<i>Rosa canina</i>	Dog rose
<i>Rubus fruticosus</i>	Bramble
<i>Salix spp.</i>	Willow
<i>Sambucus nigra</i>	Elder
<i>Sorbus aucuparia</i>	Rowan
<i>Taraxacum sp</i>	Dandelion
<i>Urtica dioica</i>	Nettle

2. Avifauna

Scientific name	Common name
<i>Acrocephalus schoenobaenus</i>	Sedge warbler
<i>Alcedo atthis</i>	Kingfisher
<i>Anas crecca</i>	Teal
<i>Anas platyrhynchos</i>	Mallard
<i>Apus apus</i>	Swift
<i>Buteo buteo</i>	Common buzzard
<i>Carduelis carduelis</i>	Goldfinch
<i>Columba palumbus</i>	Wood pigeon
<i>Corvus corax</i>	Raven
<i>Corvus corvus</i>	Grey crow

<i>Corvus frugilegus</i>	Rook
<i>Corvus monedula</i>	Jackdaw
<i>Erithacus rubecula</i>	Robin
<i>Fringilla coelebs</i>	Chaffinch
<i>Gallinago gallinago</i>	Snipe
<i>Gallinula chloropus</i>	Moorhen
<i>Hirundo rustica</i>	Barn swallow
<i>Motacilla cinerea</i>	Grey wagtail
<i>Parus ater hibernicus</i>	Coal tit
<i>Parus caeruleus</i>	Blue tit
<i>Parus major</i>	Great tit
<i>Passer montanus</i>	Tree sparrow
<i>Phasianus colchicus</i>	Pheasant
<i>Pica pica</i>	Magpie
<i>Pyrhulla pyrhulla</i>	Bullfinch
<i>Sturnus vulgaris</i>	Starling
<i>Sylvia atricapilla</i>	Black-cap
<i>Troglodytes troglodytes</i>	Wren
<i>Turdus merula</i>	Blackbird
<i>Turdus philomelus</i>	Song thrush
<i>Vanellus vanellus</i>	Lapwing (green plover)

3. Mammal Species

Scientific name	Common name
<i>Lutra lutra</i>	Otter

4. Other Species

Scientific name	Common name
<i>Anguilla anguilla</i>	Eel
<i>Austropotamobius pallipes</i>	White-clawed crayfish
Chironomidae	A family of midges
<i>Gammarus duebeni</i>	A freshwater shrimp
<i>Gasterosteus aculeatus</i>	Three-spined stickleback
Gerridae	A pond-skater family
Glossosomatidae	A caddis fly family
<i>Lampetra fluviatilis</i>	River lamprey
<i>Lampetra planeri</i>	Brook lamprey
Limnephilidae	A caddis fly family
<i>Petromyzon marinus</i>	Sea lamprey
<i>Rana temporaria</i>	Common frog
Veliidae	A water cricket family