Habitats Regulations Assessment

Report of Information to Inform an Appropriate Assessment:

718736-3000-R-017 Special Areas of Conservation - Watercourses

A5 Western Transport Corridor

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Produced for

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Schedule of Changes

The following table outlines the updates made to the Report of Information to Inform Appropriate Assessment: SAC Watercourses, on receipt of comments received in response to the 3rd consultation concluding in October 2017.

Section Edited	Update
Front Cover	Contact details and title updated
Document Control Sheet	Revision, Status, Record of Issue details, Distribution details, Footnote moved to Section 1
1.1.1	Guidance text refined
1.1.2	Minor text amendments for clarity and guidance text refined
1.1.3	Minor text amendments for clarity
1.1.4	Minor text amendments for clarity
1.1.5	Minor text amendments for clarity
1.1.6	Minor text amendments for clarity
1.1.6, Footnote 1	Minister amended to Competent Authority
1.2.1	Text deleted to avoid repetition
1.2.2	Additional text added to clarify links to national primary road network in the Republic of Ireland, other minor text amendments for clarity
1.2.3	Minor text amendments for clarity
1.2.4	Minor text amendments for clarity
Footnote 5	Minor text amendments for clarity
1.3.5	Minor text amendments for clarity
1.3.6	Minor text amendments for clarity and qualifications of reviewers added
2.2.1	Guidance text refined
2.2.4	Typo corrected
2.2.9	Minor text amendments for clarity
Tables 3.1	Land-take section Typos corrected
Tables 3.1 – 3.3	Cross reference to Statutory Consultee agreement added
Footnote 13, 14, 15, 18, 19 and 20	Cross reference updated
Footnote 17, 21,	Text added
4.2.1	Text amended to include third round of consultation

Section Edited	Update
4.2.4	Minor text amendments for clarity
4.2.11	Footnote added (24)
4.2.13	Minor text amendments for clarity
4.2.16 and References	Source of Figures added
4.2.18	Minor text amendments for clarity
4.2.18	Water Management Unit added to bullets; footnotes added, typo in footnote corrected; all subsequent footnote numbering amended accordingly; discharge rate text amended for technical accuracy; operational design parameters amended
Footnote 25	Minor text amendments for clarity
4.2.19	Cross reference updated
4.2.20	Minor text amendments for clarity
4.2.21	Standard suspended sediment value corrected to Northern Ireland value.
4.2.22	Standard suspended sediment value corrected to Northern Ireland value. Clarification of 2016 data sources.
4.2.28	Minor text amendments for clarity
4.3.3	Cross reference updated
5.1.3	Minor text amendments for clarity
5.3.2	Typos corrected and minor text amendments for clarity
5.3.3	Additional culvert amendments added
5.4.1	Typo corrected
5.5.1	Cross reference updated
5.5.2	Typo corrected
5.5.4	Text added relating to discharge velocity for technical accuracy
5.5.6	Additional text added at DfI Rivers request
5.5.7	Website URL moved to footnote
5.5.8	Minor text amendments for clarity
7.1.11	Appendix numbers updated
7.1.14	Typo corrected
7.1.22	Text updated
7.1.23	Appendix number updated, cross reference updated, text amended to reflect design parameters

Section Edited	Update
7.1.24	Appendix number updated, cross reference updated, text amended to reflect design parameters
7.1.25	Text on benefit of traffic utilising A5 WTC vs existing A5.
7.2.9	Text updated
7.2.13	Additional text relating to gabion use added; footnote added
7.2.23	Table number updated, typo corrected
7.2.25	Minor text amendments for clarity
7.2.28	Typo corrected
7.4.4	Minor text amendments for clarity
7.5.2	Text amended to reflect Appropriate Assessment undertaken for N14/N15 link
7.5.5	Paragraph removed – no longer relevant
8.1.1 & References	Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 – typo corrected and ROI regulation update
8.1.3	Paragraph removed, no longer relevant
8.1.6	Conclusion finalised
Appendix 2	Updated following discussions with consultees
Appendix 3	Updated following discussions with consultees
Appendix 4	Updated following discussions with consultees
Appendix 5	Minor Revisions following Consultation
Appendix 6	Minor Revisions following Consultation
Appendix 10	Outfalls outside the Foyle catchment removed for clarity
Appendix 11	New appendix providing Statutory Consultee agreement communications

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1 Introduction

1.1.1 This document is a Habitats Regulation Assessment (HRA)[1] which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended[2]), (the Regulations) for the proposed A5 Western Transport Corridor (A5WTC) Scheme.

1.1.2 Following consultation with Northern Ireland Environment Agency (NIEA) and National Parks & Wildlife Service (NPWS) in the Republic of Ireland ten sites were identified as ones which should be considered in accordance with the requirements of the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Regulations:

- River Foyle and Tributaries SAC
- River Finn (Republic of Ireland) SAC
- Owenkillew River SAC
- Tully Bog SAC
- Lough Swilly (including former Inch Lough and Levels) SPA
- Lough Foyle SPA (Northern Ireland)
- Lough Foyle SPA (Republic of Ireland)
- Lough Neagh and Lough Beg SPA
- Lough Foyle Ramsar Site
- Lough Neagh & lough Beg Ramsar Site

[1] The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.

[2] As amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

1.1.3 This document (HRA – SAC Watercourses) is one of four reports to inform the Appropriate Assessment, and specifically addresses the first three SAC Rivers (River Foyle and Tributaries SAC; River Finn SAC and Owenkillew River SAC).

1.1.4 A further three documents have been produced, namely:

- HRA Report - Tully Bog SAC
- HRA Report - SPAs (for Lough Swilly SPA; Lough Foyle SPA (NI and RoI); and Lough Neagh and Lough Beg SPA; and
- Ramsar Site Assessment Report[3] (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.

1.1.5 A first draft of this report was published for consultation in 2014 and responses were received at that time. The content of those responses, and any design changes which arose from the 2016 Public Inquiry into the Proposed Scheme, were taken into account in developing two further draft reports, which was published for consultation in April 2017 and August 2017 respectively in which the general public were also invited to provide responses[4].

1.1.6 The Northern Ireland Environment Agency (NIEA) as part of the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland (NI), the Loughs Agency, (as a statutory consultee for both NI and the Republic of Ireland), the National Parks and Wildlife Service (NPWS) (as a statutory consultee for the Republic of Ireland) as well as Inland Fisheries and the Royal Society for the Protection of Birds (RSPB), were consulted throughout the development stages of this report. Comments received from these bodies, as well as information and relevant comments received from public consultation, have been addressed and incorporated in this final report, which will be considered by Department for Infrastructure (DfI) as the Competent Authority when undertaking the Appropriate Assessment required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and the Regulations.

1.2 Background

1.2.1 The A5WTC is one of five key transport corridors making up the strategic road network across Northern Ireland. DfI is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province,

[3] Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites.

[4] The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- '*Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.*

provide a strategic link with international gateways. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.

1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal connects to the national primary road network in the Republic of Ireland at 2 locations, the N14/N15 roads at Strabane/Lifford into Co. Donegal and the N2 at Aughnacloy into Co. Monaghan. Donegal County Council are promoting a new road which connects the A5WTC to the N15 just south of Lifford and this connectivity has been developed in co-operation with the A5WTC project team. These proposals have been progressed through the statutory process and the decision to proceed will be confirmed so that construction and opening to traffic coincides with the opening of the A5WTC around Strabane. This scheme crosses the River Finn SAC and the proposals have been subject to HRA within the Republic and considered under the cumulative effects section of the relevant WSP reports (see 1.1.2 above). Proposals to upgrade the N2 are currently on hold and any impacts on the A5WTC at the border in Co. Monaghan cannot be assessed at this point in time, though this location nor the consequences of change at this location are considered as not affecting any of the Natura 2000 sites considered in these Reports.

1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Appendix 1 - Sheets 1 to 24:

- Phase 1a: Junctions 1-3 (New Buildings – north of Strabane) and Phase 1b: Junctions 13-15 (south of Omagh – A4,Ballygawley) between 2017 and 2019;
- Phase 2: Junctions 3-13 (north of Strabane – south of Omagh) between 2021 and 2023; and
- Phase 3: Junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.

1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened[5] the above

[5] The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by NIEA, the statutory consultee relative to the designated sites in Northern Ireland and NPWS the organisation charged with the implementation of the Habitats and Birds Directives in the ROI. However new case law on the interpretation

European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment[6].

1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.

1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.

1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a Site of Special Scientific Interest (SSSI) was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations

of 'likelihood' and additional information provided by the Loughs Agency, resulted in a need to re-screen the sites (see footnote 6).

[6] The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations. Accordingly, the sites were re-screened in 2013.

Assessments, including working with Clients, Contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

1.3.4 Stuart has been assisted by Andy Bascombe, BSC (Hons), MSc, PhD, CEnv, CSci. Andy is a Technical Director at WSP with specific responsibility for ecology, with over 25 years of experience in environmental consultancy. He holds a BSc in Biological Sciences from Leicester University, an MSc in Ecology from UCNW Bangor, and a PhD in Applied Ecology from Middlesex Polytechnic. He is a Chartered Scientist and a Chartered Environmentalist and a full member of both the Chartered Institute of Ecology and Environmental Management and the Chartered Institution of Water and Environmental Management.

1.3.5 Andy has worked on a wide range of projects in the UK and overseas for public and private sector clients, local planning authorities, government departments and other bodies, providing ecological and environmental advice at all stages of developments. He is an experienced project manager who has been responsible for environmental aspects of major developments, and has managed Environmental Statements and Environmental Impact Assessments (EIAs) produced for planning applications, undertaken specialist studies including numerous Habitats Regulations Assessments and Appropriate Assessments. He has given expert witness evidence at several Public Inquiries, and has a thorough appreciation of the requirements of all stages of development having worked on projects from conceptual design through to post-construction monitoring.

1.3.6 The assessment was also reviewed and added to by Mabbett Associates (Dr James O'Neill - BSc (Hons) Zoology PhD Ecology and Conservation, Dr Gen Cannibal - BSc Environmental Biology, MSc Environmental Assessment and Management, PhD Environmental Impact Assessment (2nd Consultation Draft) and Beverley Walker – BSc (Hons) Botany Grad Dip Env. Law (UK & EU), (2nd, 3rd Consultation Draft and final report)).

2 The HRA Process

2.1 Objectives

2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.

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

2.1.3 Favourable conservation status of a site is achieved when:

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

2.1.4 The favourable conservation status of a species is achieved when:

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

2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.

2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.

2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.

2.1.8 The purpose of this HRA report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation

measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000)', and European Commission (2001) 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the Design Manual for Roads and Bridges (DMRB) (HD44/09). EU Guidance on Climate Change and Biodiversity (2013) was reviewed.

2.2.2 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1 : Screening/Test of Likely Significance

2.2.3 This is where it is established if an Appropriate Assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2 : Appropriate Assessment (AA)

2.2.4 Should Stage 1 determine that there is a 'likelihood' of a significant effect on the qualifying features of a site, or that any significant effects cannot be ruled out, then the assessment proceeds to Stage 2. This stage considers the potential impacts on the structure and function (**integrity**), as well as the **conservation objectives** of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage includes:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of the likely impacts on the conservation objectives of the site, and an assessment of their significance;

- Mitigation Measures; and
- Conclusions.

2.2.5 If it cannot be ruled out that no significant adverse effects will occur on a site's conservation objectives, then the assessment proceeds to Stages 3 and 4.

Stage 3 : Assessment of alternative solutions

2.2.6 This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4 : Imperative reasons of overriding public interest

2.2.7 This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.8 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

2.2.9 For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

2.2.10 The definition of 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

2.2.11 The test of 'significance' is where a plan or project could undermine the site's conservation objectives. The assessment of that risk (of 'significance') must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.

3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the DMRB method of assessment, screening matrices were completed for each of the potentially affected Natura 2000 sites in 2013. Tables 3.1 to 3.3 provide this information and are supported by reference to the A5WTC ES 2010, and the A5WTC ES 2016 where appropriate.

Table 3.1 HRA Screening Matrix for the River Foyle and Tributaries SAC

Table 3.1 Screening Matrix for the River Foyle and Tributaries		
Project Name:	**A5 Western Transport Corridor (WTC)**	
Natura 2000 Site under Consideration:	**River Foyle and Tributaries SAC (UK00303320)**	
Date:	**Author (Name/Organisation):**	**Verified (Name/Organisation):**
June 2013	Stuart Ireland, Mouchel (now WSP)	Paul Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to	

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
	the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC[7].
Land-take	Some works will take place within the margins of river channels within the SAC, these are the installation of outfalls and associated headwalls (<0.01ha), and erosion protection for bridge foundations (<0.04ha). Works are also proposed for the river banks where river crossings are required. There will not be any land-take which directly removes qualifying habitat features. Outside of the SAC, works proposed to culvert and re-align watercourses could have impacts upon species qualifying features of the SAC.
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	Works will be required within the SAC in two locations; at the River Mourne close to its confluence with the River Finn and River Foyle to the north-west of Strabane and at the River Derg some 400m west of its confluence with the River Strule and River Mourne. The proposed scheme will also be located within 50m of the SAC west of Magheramason and Strabane. Part of the proposed scheme will be located along or close to watercourses associated with the River Foyle Catchment upstream of the designated site. In all instances the construction and proximity of the proposed scheme is such that its implementation could involve direct loss of primary or qualifying habitat which are identified in the citation for the SAC. It could also involve loss of such habitat as a result of sedimentation or release of other pollutants associated with construction and discharge of sediments and other traffic related pollutants associated with drainage of run off from the road once it is open to use. The construction and implementation of the proposed scheme could also have an impact on Atlantic salmon and otter as the two species identified as primary and qualifying species respectively in the citation for the SAC.
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	The proposed scheme will not involve the winning or uses of resources within the designated site or along watercourses associated with the River Foyle Catchment upstream of the designated site.

[7] Current government policy promotes a phasing out of petrol and diesel vehicles, such that there will be no new petrol or diesel vehicles sold from 2040. 2040 would therefore likely represent a peak in vehicle emissions.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The drainage for the proposed scheme involves the discharge of road related run-off and run-off from earthworks within the road corridor boundary to watercourses within the SAC and tributaries of the watercourses within the SAC. The principal watercourses within the SAC comprise the River Foyle, the River Mourne, the River Strule and the River Derg.
Excavation requirements (e.g. impacts of local hydrogeology)	The proposed works are likely to have impacts upon the local drainage systems and excavations in close proximity to sensitive watercourses, including construction of major structures.
Transportation requirements	Transportation of equipment through the SAC is not required, although works nearby the watercourse will require machinery to be in close proximity. Temporary bridges will be provided across the watercourses for construction traffic to avoid causing significant congestion on the current A5.
Duration of construction, operation, etc.	It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located outside of the River Foyle Catchment such that its construction will have no implications for the SAC.
Other	None
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	1. Open span crossings of Mourne and Derg. 2. Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. 3. Treatment of water outfalling from the scheme to reduce pollutants and sediment. 4. Provision of otter passage culverts or ledges. These measures are known to be effective, provided they are correctly implemented[8].
Location	1. Mourne and Derg crossings 2. Throughout the scheme.

[8] Note: Additional mitigation measures to ensure outfalls do not cause scour of sensitive habitats or increase velocities, are considered in the Stage 2 Assessment below.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
	3. Throughout the scheme. 4. Where otter use of watercourses has been noted.
Evidence for effectiveness	1& 2. CIRIA Construction Guidance | Pollution Prevention Guidance (PPG[9]) 3. HAWRAT assessment methodology. 4. DMRB guidance on otter and roads. These measures are known to be effective, provided they are correctly implemented.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Transport NI (now DfI) will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI (now DfI) will monitor the proposed scheme throughout construction.
Characteristics of European Site(s) *A brief description of the European Site should be produced, including information on:*	
Name of European Site and its EU code	River Foyle and Tributaries SAC (UK00303320)
Location and distance of the European Site from the proposed works	The River Foyle and Tributaries SAC extends from Magheramason in the north to Newtownstewart following the Rivers Foyle, Mourne and Strule, along the River Finn from the confluence with the Mourne to Clady, and along the River Derg from the confluence with the River Strule up into the headwaters. As a cross boundary river, the designation in the Rivers Foyle and Finn extend only to the border between Northern Ireland and the Republic of Ireland. The proposed works impinge on the boundary of the SAC watercourses through installation of outfalls and where two bridges span the designated rivers.
European Site size	770.12 ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The primary reasons for selection of the site are: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

[9] Pollution Prevention Guidance (PPG) have been replaced by Guidance for Pollution Prevention, (GPPs) in England, and for Northern Ireland by NIEA Standing Advice. https://www.planningni.gov.uk/northern_ireland_environment_agency_guidance/standing_advice.htm.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
	Atlantic salmon *Salmo salar* – the river has the largest population of Atlantic salmon in Northern Ireland, with c. 15% of the estimated spawning numbers. The majority of individuals returning are grilse (single wintering salmon) with a smaller number of spring salmon (multi-wintering salmon). Research has shown the presence of genetically distinct salmon in individual sub-catchments. Qualifying features present, but not a primary reason for site selection: Otter *Lutra lutra* – for which the area is considered to support a significant presence.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The site is particularly vulnerable to deterioration in water quality, which is both a localised and widespread issue within the catchment. Poor water quality, as a result of point-source and diffuse pollution within the catchment, and increased sedimentation can be significant influences on populations of Atlantic salmon and otter, as well as altering the biological composition of the river ecosystem. There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction activities nearby watercourses evident. It should be noted that due to the nature of the riverine ecosystem, discharges in rivers upstream of the SAC can lead to significant impacts upon the SAC.
European Site conservation objectives – where these are readily available	Atlantic Salmon: Maintain and if possible expand existing population numbers and distribution (preferably through natural recruitment), and improve age structure of population. Maintain and if possible enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate. Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation: Maintain and if possible enhance extent and composition of community. • Improve water quality • Improve channel substrate quality by reducing siltation.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
	• Maintain and if feasible enhance the river morphology Otter: Maintain and if possible increase population numbers and distribution. Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water and all associated wetland habitats
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Destruction or loss of part of the SAC Minor land take of river banks for construction of proposed bridge erosion control, and for installation of outfalls and associated headwalls is anticipated. Potential degradation of the habitat - water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation There is no anticipated direct loss of habitat extent as a result of construction or water quality deterioration as clear-span structures are provided. Shading may occur on small areas of qualifying habitat at the River Mourne and River Derg crossings. Water quality impacts are considered to be slight in three specific locations and due to the catchments size and ability to absorb minor water quality changes, neutral overall. The potential effects of sedimentation and other waterborne pollutants on features downstream of works cannot be ruled out without significant further investigation. Potential habitat degradation of the SAC and indirect effects to Atlantic salmon and otter The scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and otter. This could give rise to significant effects on the site. Potential impacts upon Atlantic salmon and otter The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration. The scheme could increase the mortality of otter.	
Initial Assessment *The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	No direct loss of qualifying habitats, however there is a low risk of loss of qualifying habitat downstream of works due to sedimentation. Minor loss of marginal, emergent and bankside vegetation is anticipated.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
Disturbance to key species	Both Atlantic salmon and otter could be subject to disturbance.
Habitat or species fragmentation	The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat.
Reduction in species density	The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat, and through an increase in road-related otter mortality[10].
Changes in key indicators of conservation value (water quality, etc.)	The scheme could result in changes in water quality a key indicator of conservation value.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	The scheme could cause fragmentation of otter and fish habitat.
Interference with key relationships that define the function of the site	The scheme could result in a reduction in the density and distribution of Atlantic salmon and otter through habitat severance, loss and decrease in water quality.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Negligible reduction in bankside and marginal habitat for otter and salmon. Low risk of qualifying habitat area reduction downstream of works.
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	There could be a significant effect subject to mitigation.
Loss	There could be a significant effect subject to mitigation.
Fragmentation	There could be a significant effect subject to mitigation.

[10] The 2017 Stage 2 Assessment reported in this document below, has also addressed scouring of sensitive salmonid (spawning) habitats as a potential impact which could reduce species density.

Table 3.1 Screening Matrix for the River Foyle and Tributaries	
Disruption	There could be a significant effect subject to mitigation.
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	There could be a significant effect subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known	
Outcome of screening stage (delete as appropriate).	Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES See Appendix 11

Table 3.2 HRA Screening Matrix for the River Finn SAC

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC		
Project Name:	***A5 Western Transport Corridor (WTC)***	
Natura 2000 Site under Consideration:	***River Finn SAC (IE0002301)***	
Date:	***Author (Name/Organisation):***	***Verified (Name/Organisation):***
June 2013	Stuart Ireland, Mouchel (now WSP)	Paul Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme does not cross the River Finn SAC but will be close to the designated site in a number of locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:	
Size and scale (road type and probable traffic volume)	The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC[11].
Land-take	There are no proposed works to take place within the river channel, however works are proposed for the river banks where drainage outfalls are required.
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The proposed scheme will come within 50m of the River Finn SAC at its closest point. There will also be some construction of drainage outfalls and their associated headwalls on the banks of the river, which while this is the River Foyle & Tributaries SAC at this point, this differentiation is caused by the international border, not by any separation of the river itself.
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	None
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The drainage for the proposed scheme involves the discharge of road related run-off and run-off from earthworks within the road corridor boundary to watercourses within the SAC and tributaries of the watercourses within the SAC.
Excavation requirements (e.g. impacts on local hydrogeology)	The proposed works are likely to have impacts upon the local drainage systems and excavations in close proximity to sensitive watercourses, including construction of major structures.
Transportation requirements	Transportation of equipment through the SAC is not required, although works nearby the watercourse will require machinery to be in close proximity
Duration of construction, operation, etc.	It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located

[11] *See* footnote 9

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
	outside of the River Foyle Catchment such that its construction will have no implications for the SAC.
Other	None
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	1. Construction of box culverts at minor watercourse crossings where salmonid interest has been noted. 2. Treatment of water outfalling from the scheme to reduce pollutants and sediment. 3. Provision of otter passage culverts or ledges. These measures are known to be effective, provided they are correctly implemented[12].
Location	1 & 2. Throughout the scheme. 3. Where otter use of watercourses has been recorded.
Evidence for effectiveness	1. CIRIA Construction Guidance | Pollution Prevention Guidance (PPG[13]) 2. HAWRAT assessment methodology. 3. DMRB guidance on otter and roads. These measures are known to be effective, provided they are correctly implemented.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Transport NI (now DfI) will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI (now DfI) will monitor the proposed scheme throughout construction.
Characteristics of European Site(s) *A brief description of the European Site should be produced, including information on:*	
Name of European Site and its EU code	River Finn SAC (IE002301)

[12] *See* footnote 10

[13] *See* footnote 11

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
Location and distance of the European Site from the proposed works	The River Finn SAC extends along the River Foyle and River Finn on the Republic of Ireland side of the border from Drumnashear in the north to Cloghfin. The river catchment upstream of Cloghfin into the headwaters falls under this SAC designation. The proposed scheme will come within 50m of the River Finn SAC at its closest point. There will also be some construction of drainage outfalls and their associated headwalls on the banks of the river, which while this is the River Foyle & Tributaries SAC at this point, this differentiation is caused by the international border, not by any separation of the river itself.
European Site size	c. 1290 ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The primary reasons for selection of the site are: Upland blanket bog - occurs throughout much of the upland area along the river margins. The bog habitats contain a variety of bog flora, including the scarce bog moss *Sphagnum imbricatum*. Qualifying features present, but not a primary reason for site selection, include: Lowland oligotrophic lakes - there are many small lakes within the site, but of note are Loughs Finn, Belshade and Derg. Typical species are present in the lake margins and Arctic Charr *Salvelinus alpinus* are present in Lough Finn. Northern Atlantic wet heath with *Erica tetralix* - associated with the blanket bog throughout the site, on shallow peats and better drained slopes. Transitional mires - occur at several locations, usually at the interface between bog or lake or stream. The diversity of the mires, including diagnostic species, is good. Atlantic salmon *Salmo salar* - The Finn is important in an international context in that it's populations of spring salmon appear to be stable while declining in many areas of Ireland and Europe. The estimated rod catch from the Finn is c. 500 – 800 spring salmon and 4,000 grilse, annually producing about 40% of the total Foyle count.[14]

[14] Since this screening report of 2013, the River Finn has failed to attain its management target of 5,410 salmon, resulting in the introduction of catch and release for all commercial fishing and angling, based on the provisions contained within The Foyle Area (Control of Fishing) Regulations 2101.

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
	Otter *Lutra lutra*.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The site is particularly vulnerable to deterioration in water quality, which arises as a result of farming practices within the catchment. Sedimentation and acidification are also considered to be threats to the SAC, in particular the sedimentation of spawning gravels. There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction activities nearby watercourses evident.
European Site conservation objectives – where these are readily available	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: [1106] *Salmo salar* (only in fresh water) [1355] *Lutra lutra* [3110] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [4010] Northern Atlantic wet heaths with Erica tetralix [7130] Blanket bogs (* if active only) [7140] Transition mires and quaking bogs
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Destruction or loss of part of the SAC There is no direct land take of the SAC. Potential degradation of Annexe I habitats. There is no potential for the scheme to affect the Annexe I habitats for which the site receives designation as these are all present upstream in the catchment and distanced from the proposed scheme. Potential habitat degradation of the SAC and indirect effects to Atlantic salmon and otter Although the proposed scheme has no direct land take within the SAC, the scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and otter. This could give rise to significant effects on the site. Potential impacts upon Atlantic salmon and otter The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration, although most of these effects would be outside of the SAC itself.	

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
Initial Assessment *The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	In is not anticipated that there will be any change in the habitat area of the SAC as a result of this project.
Disturbance to key species	Both Atlantic salmon and otter could be subject to disturbance outside of the SAC.
Habitat or species fragmentation	The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat outside of the SAC.
Reduction in species density	The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat outside of the SAC, and through road-related otter mortality[15].
Changes in key indicators of conservation value (water quality, etc.)	Without mitigation the scheme could result in changes in water quality, a key indicator of conservation value.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	The scheme could cause fragmentation of otter and fish habitat.
Interference with key relationships that define the function of the site	The scheme could result in a reduction in the density and distribution of Atlantic salmon and otter through habitat severance, loss and decrease in water quality.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	None
Disturbance to key species	There could be a significant effect subject to mitigation.

[15] See footnote 12

Table 3.2 (Stage 1) Screening Matrix for River Finn SAC	
Habitat or species fragmentation	There could be a significant effect subject to mitigation.
Loss	There could be a significant effect subject to mitigation.
Fragmentation	There could be a significant effect subject to mitigation.
Disruption	There could be a significant effect subject to mitigation.
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	There could be a significant effect subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES See Appendix 11

Table 3.3 HRA Screening Matrix for the Owenkillew River SAC

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC		
Project Name:	***A5 Western Transport Corridor (WTC)***	
Natura 2000 Site under Consideration:	***Owenkillew River SAC (UK0030233)***	
Date:	***Author (Name/Organisation):***	***Verified (Name/Organisation):***
June 2013	Stuart Ireland, Mouchel (now WSP)	Paul Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and		

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.	
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:	
Size and scale (road type and probable traffic volume)	The project involves the construction of an 85 km long dual carriageway involving the crossing of large number of watercourses that will run for the entire length of the scheme, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. This may impact on water quality and thus on features of the SAC[16].
Land-take	No works are proposed to take place within the SAC.
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The SAC is relatively isolated from the works directly, with the route passing Newtownstewart to the west, approximately 1.8km from its nearest point.
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	None
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	No discharges or other emissions are likely to have an adverse effect on the SAC due to the distance of the SAC from the proposed scheme.
Excavation requirements (e.g. impacts of local hydrogeology)	No adverse effects are likely due to the distance of the SAC from the proposed scheme.
Transportation requirements	Transportation of equipment through the SAC is not required as there are no works nearby.

[16] *See* footnote 9

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
Duration of construction, operation, etc.	It is anticipated that construction of phases 1 and 2 will last for approximately three years in each instance. Phase 3 is located outside of the River Foyle Catchment such that its construction will have no implications for the SAC.
Other	None
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	1. Construction of box culverts at minor watercourse crossings where salmonid interest has been noted. 2. Treatment of water outfalling from the scheme to reduce pollutants and sediment. 3. Provision of otter passage culverts or ledges. These measures are known to be effective, provided they are correctly implemented[17].
Location	1 & 2. Throughout the scheme. 3. Where otter use of watercourses has been recorded.
Evidence for effectiveness	1. CIRIA Construction Guidance | Pollution Prevention Guidance (PPG)[18] 2. HAWRAT assessment methodology. 3. DMRB guidance on otter and roads. These measures are known to be effective, provided they are correctly implemented
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Transport NI (now DfI) will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by Transport NI (now DfI) will monitor the proposed scheme throughout construction.
Characteristics of European Site(s)	

[17] *See* footnote 10
[18] *See* footnote 11

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Owenkillew River SAC (UK0030233)
Location and distance of the European Site from the proposed works	The Owenkillew River SAC extends from the confluence of the river with the River Strule, to the east of Newtownstewart, to the edge of Davagh Forest, near its source. The SAC is relatively distanced (circa 1.8km) from the proposed works; however the scheme crosses or comes in close proximity to watercourses upstream and downstream of the SAC.
European Site size	213.46 ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The primary reasons for selection of the site are: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation – Beds of stream water-crowfoot *Ranunculus penicillatus* spp. *penicillatus* occur throughout its middle and lower reaches, typically in association with intermediate water-starwort *Callitriche hamulata* and large-leaved pondweeds such as broad-leaved pondweed *Potamogeton natans* and shining pondweed *P. lucens*. Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles – The Owenkillew River is associated with several woodlands which in combination represent one of the best examples of old sessile oak woodland in Northern Ireland. Freshwater pearl mussel *Margaritifera margaritifera* – the freshwater pearl mussel population, estimated to have reached a minimum of 10,000 individuals, is confined to a 4km reach of undisturbed river channel and is the largest known population surviving in Northern Ireland. Qualifying features present, but not a primary reason for site selection, include: Bog woodland; Atlantic salmon *Salmo salar*; and Otter *Lutra lutra*.
Vulnerability of the European Site – any information available from	Poor water quality is suspected to be a major influence on freshwater pearl mussel recruitment, affecting both adult and juvenile survival, and availability of host salmonids, required

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
the standard data forms on potential effect pathways	during their parasitic stage, as well as altering the biological composition of the river ecosystem. Freshwater pearl mussel is susceptible to increased sediment in the water, resulting from harvesting of conifer plantations and diffuse run-off from degenerated peatland in the upper catchment. The vulnerability of anadromous salmonids to deterioration in water quality is considered to be of importance as decreases in the salmonid population of the Owenkillew River SAC could have implications upon the viability of the freshwater pearl mussel population. There are many potential effect pathways, with discharges into watercourses (construction and operational) and construction activities nearby watercourses evident. It should be noted that due to the nature of the riverine ecosystem, discharges in rivers upstream and downstream of the SAC can lead to significant impacts upon the SAC.
European Site conservation objectives – where these are readily available	Freshwater Pearl Mussel: • Maintain and if feasible enhance population numbers through natural recruitment. • Improve age structure of population. • Improve water quality. • Improve channel substrate quality by reducing siltation. • Ensure host fish population is adequate for recruitment. • Increase the amount of shading through marginal tree cover along those sections of river currently supporting this species. Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation: • Maintain and if feasible enhance extent and composition of community. • Improve water quality • Improve channel substrate quality by reducing siltation. • Maintain and if feasible enhance the river morphology Old Sessile Oak woods with *Ilex* and *Blechnum* in the British Isles: • Maintain and expand the extent of existing oak woodland. (There is an area of degraded bog, wetland and damp

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
	grassland which have the potential to develop into oak woodland • Maintain and enhance Oak woodland species diversity and structural diversity. • Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen, swamp, grasslands, scrub, especially where these exhibit natural transition to Oak woodland • Seek nature conservation management over adjacent forested areas outside the ASSI where there may be potential for woodland rehabilitation. • Seek nature conservation management over suitable areas immediately outside the ASSI where there may be potential for woodland expansion.
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Destruction or loss of part of the SAC There is no direct land take of the SAC as the site is approximately 1.8km from the proposed works. Potential degradation of Annexe I habitats There is no potential for the scheme to affect the Annexe I habitats for which the site receives designation as the site is distanced from the construction activities of the proposed scheme. Potential habitat degradation of the SAC and indirect effects to freshwater pearl mussel, Atlantic salmon and otter It is possible that the scheme will have an impact on the habitat of Atlantic salmon and otter in the wider environment through construction and operation of the proposed scheme. Potential impacts upon freshwater pearl mussel, Atlantic salmon and otter The scheme could give rise to significant effects on Atlantic salmon and otter in the wider environment as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration.	

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
Initial Assessment *The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	There will be no change in the habitat area of the SAC as a result of this project.
Disturbance to key species	None within the SAC.
Habitat or species fragmentation	The scheme could cause a significant effect to species due to fragmentation of otter and salmon habitat outside of the SAC.
Reduction in species density	The scheme could result in a reduction in species density through pollution/sedimentation of reproductive habitat outside of the SAC[19].
Changes in key indicators of conservation value (water quality, etc.)	No changes in the physical indicators of conservation value will occur through this project.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	The project will not have any influence on the structure of the SAC.
Interference with key relationships that define the function of the site	The project has the potential to impact on the conservation status of otter and Atlantic salmon in the wider environment, which could have a resultant impact on the function of the SAC.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	None
Disturbance to key species	None
Habitat or species fragmentation	There could be a significant effect outside the SAC, subject to mitigation.

[19] See footnote 12

Table 3.3 (Stage 1) Screening Matrix for the Owenkillew River SAC	
Loss	There could be a significant effect outside the SAC, subject to mitigation.
Fragmentation	There could be a significant effect outside the SAC, subject to mitigation.
Disruption	There could be a significant effect outside the SAC, subject to mitigation.
Change to key elements of the site (e.g. water quality, hydrological regime etc.)	There could be a significant effect outside the SAC, subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant Effect Possible on Habitats, Salmon and Otter. Assessment progressed to Stage 2.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES See Appendix 11

3.1.2 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for all three SAC's:

- that the proposed Scheme is a project which is not connected with or necessary to the management of the implicated SACs;
- that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of the designated sites and associated watercourses, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
- that Stage 2 Appropriate Assessments should be undertaken.

4 Stage 2 - Appropriate Assessment (AA)

4.1 Introduction

4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:

- A description of the Natura 2000 sites that will be considered in the AA;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
- Mitigation Measures;
- Re Assessment of the scheme with the inclusion of mitigation, and
- Conclusions.

4.2 Scope of the information used to inform the Appropriate Assessment

4.2.1 This section describes the data sources and studies undertaken, the methodologies applied and design parameters taken into account, to inform this stage of the HRA process, and follows on from the information presented in the Screening Tables above, as well as any updates in scientific information or mitigation measures, where relevant. In addition, relevant comments resulting from the third round of consultation (concluding October 2017) have also been considered. This section addresses:

- Direct and indirect loss of qualifying habitat;
- Atlantic Salmon;
- Fresh water pearl Mussel;
- Otter;
- Mitigation; and
- Assessment of Adverse effects on Site Integrity.

Loss of habitat identified as a primary reason for selection of the SACs or as qualifying features within the SACs

4.2.2 The assessment has addressed both direct loss of qualifying habitats and indirect loss of qualifying habitats through deterioration in water quality or shading, and/or from scouring or changes in flow velocity arising from discharge.

4.2.3 The studies and assessments have involved a review of the data relevant to open span bridges, culverts, watercourse diversions and drainage outfalls included in the A5WTC ES 2010 and A5WTC ES 2016, and derived from site surveys undertaken between 2009 and 2014 to establish if the presence of the road-related features will involve the loss of relevant habitat.

4.2.4 The design specifications for the drainage system, including retention ponds and culverts as applied in the 2016 EIA and previous drafts of the reports to inform an Appropriate Assessment has been based on a climate change allowance agreed by DfI Rivers (formerly Rivers Agency), who have adopted a factor of 20% extra rainfall/peak flows to assess the potential impacts of long term climate change. This has been based on UK climate change predictions from 2009. Accordingly, the validity of these forecasts has been reviewed as part of this HRA process, using the latest guidance from UKCP09[20], prior to its proposed update in 2018 (UKCP18).

4.2.5 The guidance (*Is UKCP09 still an appropriate tool for adaptation planning? April 2016*) concludes that UKCP09 continues to provide a valid assessment of future climate change over land. In particular it demonstrates that UKCP09 is comparative with results from the most recent assessment by the International Panel on Climate Change (IPCC), (CIMP5), such that:

- Future changes in summer and winter temperatures are consistent between CIMP5 and UKCP09 projections;
- Future winter rainfall changes are consistent between both models.
- Both CIMP5 and UKCP09 projections agree that long term average of summer rainfall are more likely to reduce than increase, however CIMP5 predicts a larger chance of an increase in summer rainfall, and less risk of a substantial reduction than UKCP09. This is attributable to the use of different data sets.
- Notwithstanding, the guidance states that users should still continue to regard the full range of UKCP09 results as plausible outcomes for summer rainfall, to consider planning decisions.

4.2.6 The review has concluded that the most up to date projected changes to the baseline environment with regard to precipitation and surface flows in streams as a consequence of climate change, remain the same as those used in the EIA and previous HRA reports. For summer precipitation and river flow UKCP09 represents a worse-case scenario and under the precautionary principal, has been appropriately adopted as the working assumptions for the Scheme and in this HRA.

4.2.7 Additional consideration has been given to the potential impacts of scouring of the river beds and bank erosion and sensitive fisheries habitats, particularly during summer low flows. The guidance in DMRB HA107/04: Design of Outfall and Culvert Details is used to assess and

[20] The most recent national projections of climate change are provided through the UK Climate Projections (UKCP09) and they currently form the UK Government's official scientific basis for planning climate change adaptation activities

design out the physical impacts of potential scour and erosion on the watercourse banks and channels but this does not directly relate to the sensitivity of the receiving habitat in ecological terms. As such the design parameters relating to the discharge flow rate into the receiving watercourse have also been taken into account.

Disturbance or harm to Atlantic salmon

Baseline Data sources

4.2.8 The following data sources have been relied on:

- data provided in the 2010 and 2016 ES;
- data derived from site surveys undertaken between 2012 and 2014 by the Mouchel (now WSP) assessment team at specific locations where the provision of bridges, culverts, watercourse diversions and drainage outfalls will involve construction on watercourses within the wider Foyle Catchment to establish the presence, potential presence or absence of salmonid holding (resting), spawning or nursery habitat in the specific locations;

4.2.9 Where either or both of the two sets of data relating to location-specific and section-related salmonid interest have indicated salmonid presence or potential they have been classified as sections of salmonid watercourse. For the purposes of this initial assessment, and in keeping with a precautionary approach, it has been assumed that all watercourses with salmonid potential are utilised by Atlantic salmon.

4.2.10 The location-specific site surveys were undertaken in August and September 2012, July to September 2013 and January 2014. The surveys were conducted in accordance with guidance issued by the former Department of Agriculture for Northern Ireland (Fisheries Division) and agreed with Loughs Agency. The relevant watercourses were surveyed 250m upstream and downstream from each bridge, culvert, watercourse diversion or outfall. The following data was collected:

- Flow velocity – this was taken where possible using an in-stream flow meter with impeller to provide a count or measured by timing a floating object over a known distance, velocity has then been calculated using the count, depth and width measurements – the flow velocity is critical to keep eggs/fry in a spawning/ nursery area well oxygenated,
- In-stream vegetation – presence and extent was estimated looking downstream to the left and right – in-stream vegetation can provide adequate cover in the nursery habitat as shelter from predators,
- The extent of mature scrubby bank cover where present – mature scrubby vegetation can provide cover for nursery areas as well as stability and cover in holding areas,

- The extent of overhanging bank cover where present – overhanging tree and scrub cover can enhance the food supply available for fry in nursery areas by way of insects dropping off branches into the water,

- Water depth – the depth of the water is important for all three habitat classifications. Adequate depth in spawning areas ensures that redds[21] are covered by water at all times. Shallow water in the nursery area makes the fry less vulnerable to predation not only from larger fish but also rippling of the water surface makes them less easily seen by birds. Deeper water allows adult fish to rest where the minimum energy is required to stay on station,

- Water width – this measurement has been used in combination with depth to calculate flow velocity,

- Substrate type – this has been measured as a percentage of bedrock, boulder, cobble, gravel, fines, sand, silt and mud – a stable substrate in holding areas allows adult fish secure resting areas on a staged ascent/ descent of the river. A stony substrate provides good shelter from predators and creates more territory space allowing it to accommodate more fry in the nursery area. This stable environment also will invariably have more invertebrates living on the stones as a source of food for the fry. The presence and size of gravel is critical for the creation of a redd in salmonid spawning areas whilst the presence of large quantities of finer silt material with gravel can cause compaction of the gravel making redd construction more difficult and reduce oxygen supply to the eggs,

- Gravel depth – the depth of gravel and, thereby, the potential depth of a redd exerts a strong influence on spawning in relation to the size and type of fish able to lay eggs in an area.

4.2.11 In addition, in July 2017, Loughs Agency provided their own survey data relating to the various fishery/salmonid habitats within the river systems. This data covered a number of the watercourses crossed by A5WTC where the proposed bridges, culverts, watercourse diversions and drainage outfalls are located and established the presence, potential presence or absence of salmonid holding, spawning or nursery habitat in the relevant sections. Where there is no equivalent survey data from Loughs Agency for any watercourse that is crossed by the proposed road, a precautionary approach has been taken and the river habitat assumed to be for spawning or nursery use by the Salmon. The figures in Appendix 1 – Figures 8 -13 show the various habitats at the locations of a number of the proposed crossing points for which Loughs Agency data was available[22].

[21] A redd is a spawning nest dug in gravels of the stream bed by fish, especially salmon

[22] The habitats survey information shown on these figures was provided by the Loughs Agency from an unpublished data set.

Information to support the assessment of potential impacts

4.2.12 The assessments relative to impacts associated with the future use of the proposed scheme have focused on:

- discharge of sediments and pollutants from drainage outfalls which could result in the smothering of salmonid habitat and harm to fish as they pass through the relevant section of watercourse;
- fragmentation associated with obstruction of passage along watercourses; and
- the potential for scour and changes to velocity of discharge to damage gravel bed spawning habitats (addressed above).

4.2.13 The data collected from the location-specific surveys has been reviewed and each location has been classified relative to its salmonid potential in accordance with the Annex 1 Habitat Classification detailed in the Fisheries Division guidance. Each location has been categorised relative to holding spawning or nursery habitat into one of four grades, grade 1 being optimal habitat and grade 4 indicating an absence of habitat or habitat which is failing. Only locations with classifications of grade 4 relative to all three holding, spawning or nursery habitat types have been excluded as not being of salmonid interest.

4.2.14 In relation to discharge of sediments and other road related pollutants from the proposed road drainage networks, analysis and calculations have been undertaken to establish if design parameters agreed with NIEA and Loughs Agency, will be likely to be achieved and if water quality relative to sediments and other pollutants, such as metals and hydrocarbons, associated with road related run-off will prove acceptable in the context of the ecological status of the watercourses using the Highways Agency Water Risk Assessment Tool (HAWRAT). The HAWRAT is an assessment tool which is recommended in Volume 11 of the DMRB and which has been agreed with the Statutory Bodies responsible for water quality throughout the UK. NIEA has agreed it as the appropriate means of assessing the discharge concentrations for the proposed scheme. The outcome from the application of the HAWRAT is that a discharge will either pass or fail in light of the predicted concentrations of sediments and other pollutants and the sensitivity for the receiving watercourse. Where the evaluation has indicated an outfall will fail, appropriate combinations of mitigation measures have been identified and the evaluation has been re-run until the outfall achieves a pass.

4.2.15 With regard to scour and increases in velocity, long term climate change projections indicate that natural winter precipitation is predicted to increase, with more frequent extreme winter events with consequent increases in river flows. By contrast, summer temperatures will increase and precipitation will likely decrease. As a function of runoff volume, there will be reduced river flows in summer.

4.2.16 In the long term, it is predicted that the Q95 flows in watercourses in Northern Ireland will reduce due to the warmer drier summers. In other words, low flows in watercourses are projected to decrease over time by the order of +12% (increase) to -21% (reduction) by the 2020s, and -17% to -41% by the 2080s (UKPC09, Murphy *et al* 2009).

4.2.17 In view of these long-term projections of hotter and drier summers and reduction in Q95 the impact assessment has been updated to contain consideration of the potential for scour and changes to velocity of discharge with regard to river bed habitat.

Design parameters

4.2.18 The proposals have been based on the following design parameters:

Construction

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a target limit of 50mg/l end of pipe Total Suspended Solids (TSS) level at all discharges to watercourses in accordance with NIEA Water Management Unit (WMU) requirements[23];
- adoption of a 25mg/l maximum uplift against background TSS levels for non-sensitive watercourses, and a maximum uplift in accordance with Common Standards for Monitoring Freshwater Fauna (CSMFF)[24] for sensitive watercourses, as agreed with Loughs Agency;
- adoption of the Q90[25] velocity for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency; and
- a limiting discharge velocity depending upon the sensitivity of the habitat of the receiving watercourse.

Operation

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- outfalls must pass HAWRAT and Environmental Quality Standard (EQS) tests for sensitive watercourses;

[23] NIEA WMU set a standard discharge limit for construction sites across Northern Ireland of 50mg/l TSS end-of-pipe discharge. This limit is set so that water flowing from a site has a maximum level of suspended sediment which can readily be diluted by the receiving watercourses to levels which are safe for salmonids.

[24] Common Standards for Monitoring: Freshwater Fauna (JNCC October 2015). Updated from 2005.

[25]The Q90 velocity is the rate which is exceeded 90% of the time in a watercourse, and is calculated using computer modelling of the watercourse's catchment.

- adoption of the Q90[26] velocity for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency; and

- a limiting discharge velocity depending upon the sensitivity of the habitat of the receiving watercourse

Information used to determine mitigation measures

4.2.19 Information relating to the nature of the construction activities which will be required to install the proposed bridges, culverts, watercourse diversions and drainage outfalls has been confirmed with by DfI's appointed contractors for the proposed scheme. Consideration has also been given to sections of watercourses which will be located within 50m of the proposed working areas and, hence, where the risk of migration of sediments over ground, particularly during rainfall, could have an impact on water quality and /or marginal and aquatic habitats. The assessment has involved consideration of the risk taking into account proposed mitigation measures which have been agreed with the contractor advisors and which will be incorporated into a Construction Environment Management Plan (CEMP) and Silt Management Plan (SMP) which contractors will be required to adopt during construction. DfI is aware that the final responsibility for ensure no adverse impacts on the integrity of the SAC rests with themselves, and will implement ongoing monitoring of the effectiveness of the CEMP and the SMP through the implementation of standard audits of contractor compliance and through an Adaptive Monitoring Plan (see 7.1.14).

4.2.20 Construction phase threshold in concentrations of in-stream sediment, measured as TSS above background levels, will be determined in accordance with the updated CSMFF, with reference to baseline monitoring data collected prior to the commencement of construction. These Standards will be adhered to during construction for watercourses identified as having Atlantic salmon spawning or nursery interest.

4.2.21 Evaluation of the 50mg/l discharge threshold at outfalls has involved adoption of the standard TSS value of 116mg/l for untreated road and identification of appropriate combinations of mitigation measures for inclusion in the drainage design to achieve a minimum 57% sediment treatment required to achieve the threshold. The untreated TSS value has been taken from Phase 2 of the Improved Determination of Runoff from Highways Project (Crabtree et al, 2007).

4.2.22 The calculations relating to the 25mg/l downstream concentrations have involved use of the local standard annual average rainfall value in combination with the impermeable area of each drainage network to establish an annual volume of water draining through each network to outfall. The standard TSS value of 116mg/l for untreated road runoff adopted for evaluation of the 50mg/l discharge threshold has been applied. The sediment loading has been compared to the receiving annual water flow volume and TSS data for the receiving watercourse. Data for TSS was gained from a combination of Loughs Agency and NIEA Monitoring Stations and surveys undertaken by WSP prior to the publication of the A5WTC ES 2010. For the 2016 ES

publication updated data was provided by NIEA and Loughs Agency. Where the calculation has indicated a concentration will exceed the in-stream threshold, appropriate combinations of mitigation measures have been identified and the calculation has been re-run until the outfall achieves a pass.

4.2.23 The identification of the specific mitigation measures proposed for each drainage outfall has involved the adoption of the most onerous combination of measures in light of the outcome of all evaluations.

4.2.24 Where more than one outfall discharges into the same reach of a watercourse the combined impacts will be more significant. In these circumstances the outfalls were subject to an aggregate assessment in HAWRAT.

4.2.25 To aggregate the outfalls the drained areas were simply added together. The location on the watercourse used for the cumulative assessment was positioned downstream of the last outfall in the reach. For this purpose a reach is defined as a length of watercourse between two confluences, as the available dilution and stream velocity will naturally change at confluences and influence the assessment.

4.2.26 Watercourse reaches can vary greatly in length. Therefore, for the assessment of the impacts of soluble pollutants, only outfalls within 1km of each other along the length of a watercourse were aggregated for cumulative assessment. When assessing the combined impact of sediment bound pollutants, outfalls within 100m of one another were assessed. Beyond 100m, the road runoff sediment is likely to be sufficiently diluted with natural sediments so as not to have an adverse impact[27].

Disturbance or harm to freshwater pearl mussel

4.2.27 The assessment relating to freshwater pearl mussel has involved reference to current data available from the Centre for Environmental Data and Recording (CEDaR) in the context of the species as a qualifying feature within the Owenkillew River SAC.

4.2.28 The location of the species in the context of the SAC relates to a 4km section of the upper reaches of the watercourse. The screening for the SAC recognised there will be no risk of direct impact, the proposed scheme being located many kilometres downstream of the relevant section of the watercourse. Consideration has, however, been given to indirect impacts that could potentially arise as a result of impact on fish in the wider Foyle catchment and a reduction in the potential transport of glochidia[28] to other areas of suitable habitat within the Owenkillew River and wider catchment.

[27] In accordance with DMRB Volume 11 Section 3 Part 10 HD45/09 Annex I

[28] Glochidia are parasitic larvae of the freshwater pearl mussel (and certain other bivalve molluscs), which attach themselves by hooks or suckers to the gills or fins of fish.

Disturbance or harm to otter

Baseline Data sources

4.2.29 The following data sources have been relied on:

- data provided in the 2010 ES and 2016 ES.

4.2.30 The surveys involved recording of evidence along both banks of each watercourse by experienced otter surveyors following procedures detailed in the Otter Surveys – NIEA Specific Requirements (NIEA, 2013[29]). In common with the surveys along watercourses reported in the A5WTC ES 2010, surveys were conducted 250m upstream and downstream from proposed bridges, culverts, watercourse diversions and outfalls. Searches were undertaken for potential holts, runs leading away from the water and otter spraints, with particular note being taken of large collections of spraints which could indicate a more sensitive otter site near-by. Transects were also walked where practical, parallel to the waterways, to detect any potential otter runs leading to den sites. Any potential runs were followed and searched for evidence of use by otter in the form of footprints and spraints.

Information to support the assessment of potential impacts

4.2.31 The data derived from the sources described above has been reviewed to establish those watercourses where there will be bridges, culverts, watercourse diversions or drainage outfalls and where the proposed scheme would be in close proximity to watercourses and it has been established they are used by the species.

4.2.32 The locations have then been evaluated to determine the nature of the potential impacts on the species including loss of marginal and aquatic habitat, resting places and holts and fragmentation of corridors used by the species leading to potential mortality, injury or loss of access to shelter and resting places as a result of the construction and future use of the proposed scheme.

4.2.33 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures to safeguard the availability of habitat and passage along corridor used by the species. This mitigation is discussed further below.

4.3 Determination of adverse impact relative to integrity

4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 sites. The assessment determines whether there is likely to be:

[29] Updated guidance was released by NIEA in 2015. The survey methods used to inform this assessment comply with those requirements and are robust.

- a reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and

- whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.

4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 9.

4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated site, as discussed in Section 2.2.10.

5 Description of the proposed scheme

5.1 Alignment and relationship to the SACs

5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the SACs and wider Foyle Catchment is shown in Appendix 1 - Figures 1 to 6.

5.1.2 The proposed dual carriageway initially runs east of the River Foyle and Tributaries SAC and River Finn SAC between Magheramason and the River Mourne at Strabane. As it runs south it crosses two tributaries of the Foyle, the Burn Dennet and the Glenmornan River and a number of small watercourses and drainage channels which feed into the main river channel and the two principal tributaries. It is at its closet to the designated site at Magheramason (some 50m). South of Magheramason and as far as Cloghcor it is generally between 1 and 2km distant from the designated sites. South of Cloghcor the dual carriageway follows the eastern edge of the River Foyle floodplain between 500m and 800m distant from the SACs.

5.1.3 The dual carriageway then follows an alignment along the western margin of Strabane crossing the River Foyle and Tributaries SAC close to the existing bridge over the Mourne River and running close to the eastern boundary of the River Finn SAC as far as a proposed roundabout (J7) located adjacent to the bank of the river which defines the River Foyle and Tributaries SAC boundary. The dual carriageway then follows a south-easterly alignment away from the River Foyle and Tributaries SAC and River Finn SAC. It is located on the eastern-facing slopes of the Mourne Valley at a distance varying between 500m and 1.5km from the western margins of the river which define the boundary to the SACs. It crosses a small tributary of the Mourne River as it approaches and passes west of Victoria Bridge some 700m west of the tributary's confluence with the main river and SAC.

5.1.4 Approximately mid-way between Victoria Bridge and Newtownstewart the dual carriageway crosses the River Derg, one of the tributaries included in the SAC, some 700m west of the confluence of the River Derg, the Mourne River and the River Strule. As the dual carriageway runs south across the wide Derg Valley it crosses over a south to north flowing tributary of the River Derg west of Wood Hills and then ascends the hills west of Newtownstewart. It passes west of Newtownstewart some 500m west of the settlement limits. At this point the dual carriageway will be approximately 900m west of the Foyle and Tributaries SAC where the River Strule flows to the east of the town and 1.8km west of the Owenkillew River SAC where it extends east from the Owenkillew's confluence with the River Strule. It is the confluence of the two rivers that marks the southernmost limit of the Foyle and Tributaries SAC[30].

5.1.5 Continuing south of Newtownstewart, the dual carriageway will curve to the south-west and descend the eastern facing slopes of the Strule Valley to follow an alignment on the lower

[30] It is recognised within this assessment that the lifecycle requirements of Atlantic salmon extend beyond the extent of the SAC boundaries, and that the species spawning habitat may be upstream of the designated sites.

valley slopes. It will be 200-300m distant from the River Strule and separated from the margins of the river channel by the existing A5.

5.1.6 As the dual carriageway emerges from the valley the river will become markedly more distant from the dual carriageway where the river channel is located in a significant easterly-orientated meander. The dual carriageway continues on its south-westerly alignment passing west of Mountjoy and east of Tully Bog to a crossing of the Fairy Water some 400m north-west of its confluence with the River Strule. Throughout this section of the alignment the dual carriageway is located some 1km – 2km from the River Strule and will cross a number of small tributaries of the main river and drainage channels which feed into the tributaries.

5.1.7 Once the dual carriageway has crossed the Fairy Water and its wide floodplain, it will follow a wide arc west of Omagh to a new junction (J13) south of the town. It will cross a number of small watercourses which run in an easterly direction through the urban area to the River Strule as it flows through the town. North-west of J13 it will cross the Drumragh River as it meanders west and then south to north to its confluence with the River Strule close to the town centre.

5.1.8 South of J13 the dual carriageway generally follows a north to south alignment crossing tributaries of the Camowen River between Doogary Bog and Moylagh, a tributary of the Routing Burn at Moylagh, the Routing Burn north of Newtownsaville and the head of a tributary of the Routing Burn south of Newtownsaville.

5.1.9 The proposed scheme will then continue south, descending through the Brougher Ridge and into the Blackwater River Catchment. There is no relationship between these sections of the proposed scheme and watercourses within the Foyle Catchment, parts of which form the focus of the three SACs under consideration.

5.2 Bridges

5.2.1 Open span bridges are proposed where the dual carriageway crosses the seven principal rivers within the Foyle Catchment, namely the Burn Dennet, Glenmornan River, River Mourne, River Derg, Fairy Water, Drumragh River and the Routing Burn. The bridges at the River Mourne and River Derg will span locations where the watercourses are within the Foyle and Tributaries SAC. In both instances the bridge abutments will be located outside of the SAC boundary.

5.3 Culverts and piped watercourses

5.3.1 Wherever the proposed scheme crosses watercourses, other than the seven rivers described above, the proposals provide for the introduction of a culvert on the existing line of the watercourse or a culvert which forms part of a diverted section of watercourse. The latter approach is to be adopted where the angle of the crossing would require an overly long culvert or relative levels between the carriageways and existing channel of the watercourse require diversion to achieve appropriate clearances.

5.3.2 A total of 107 culverts are proposed within the SAC catchment area. These are scheduled in Appendix 2 and indicated in Appendix 1 - Figures 1 to 6. Selection of the form of culvert to be

provided relates to the volumes of flow, context relative to floodplains and status relative to salmonids. Box culverts are proposed where volumes and/or the flooding regime indicates a need. They are also provided where the sections of watercourse have been identified as ones with salmonid presence or potential identified in accordance with the data, surveys and criteria described section 4. Those where salmonid potential has informed the selection of box culvert are indicated in the schedule in Appendix 2.

5.3.3 Loughs Agency have, however, identified 2 new culverts on undesignated watercourses (culvert ref S2-PC-01 on watercourse UD 15 and culvert ref S2-PC-12 on UD 26) which because of their sensitivity and value, require to be open span structures which do not disturb the channel bed, and a further 2 culverts which are required to be box structures rather than pipes (culvert ref S1-PC-25 on watercourse UD 10 and culvert ref S3-PC-66 on watercourse UD 61.2).

5.3.4 The design for culverts provided in light of the salmonid potential of a watercourse allows for a 350mm embedding of the culvert base below existing ground level and import of boulders and clean gravels which have been screened to ensure no invasive species are imported. The boulders and gravels will be substantially filled to the embedded depth to recreate suitable habitat and allow the generation of a narrower channel during periods of lower flow. The channel will not be completely filled to allow for natural recruitment of river bed material and formation of a 'natural' channel.

5.3.5 Boulders will also be located upstream and downstream of the culverts to enhance the value of these locations as resting areas prior to and following the passage of fish through the structures. Placement of the boulders and gravels within the culverts and upstream and downstream of them will be undertaken in consultation with Loughs Agency personnel.

5.3.6 Construction of all culverts will involve either the introduction of a temporary diversion to maintain flows and passage along the watercourses where the culvert is on line or the completion of construction of the culverts on diverted sections or watercourse in advance of the abandonment of the existing section of watercourse which is being diverted.

5.4 Watercourse diversions

5.4.1 A total of 77 watercourse diversions are proposed along watercourses located within the Foyle and Tributaries catchment. They are scheduled in Appendix 3. Their location is indicated in Appendix 1 - Figures 1 to 6. The schedule in Appendix 3 also indicates those sections of watercourse which have been identified as being of salmonid interest.

5.4.2 The construction of all watercourse diversions will involve the completion of construction of the diversions in advance of the abandonment of the existing section of watercourse which is being diverted.

5.5 Drainage and outfalls

5.5.1 The drainage and outfall designs have been based on the design parameters described in 4.2.19.

5.5.2 A total of 151 permanent drainage outfalls are proposed to watercourses within the River Foyle Catchment. These are scheduled in Appendix 4. Their location is indicated in Appendix 1 - Figures 1 to 6 and Sheets 1-24.

5.5.3 Construction of the proposed outfalls will involve localised removal of bankside and marginal vegetation and installation of headwalls, wingwalls and aprons as indicated in the typical outfall detail provided in Appendix 1 - Figure 7.

Mitigation through design

5.5.4 Management of the discharge water quality, quantities, flow rates and velocities into the SAC watercourses, and incorporation of these measures into the design of the Scheme is considered the most important consideration for maintenance of the integrity of the SACs.

5.5.5 The drainage strategy for the proposed scheme provides for discharge of road related run-off to existing watercourses. It includes a range of Sustainable Drainage Systems (SuDS) features focused on the interception and reduction in concentrations of sediments and other potentially harmful substances which are either suspended or in soluble form within road related run-off prior to discharge, as well as measures to ensure the outfall does not cause scour of sensitive salmonid habitats, or displacement of salmon.

5.5.6 Without considering effects of changes in water quality, salmonid fish are prone to favour water with higher flow rates as these conditions are likely to be more desirable because of greater dissolved oxygen levels and their tendency to remove the finer particulate material so keeping gravels in the basal substrate clean. Water velocities, however, should not be so high that they are likely to cause consistent or extensive scour of the gravels within the substrate, although peaks of very high water flow are likely to have negligible adverse effects in the long term. Long terms climate change forecasts of hotter and drier summers, and the projected reduction in Q95 exceedance for surface water flows across Northern Ireland, has the potential to affect dissolved oxygen demand and salmonid use of the rivers, as well as to exacerbate the risk of scour due to flashy discharges. For this reason a precautionary principle when designing the outfalls has been applied. This approach means that water velocities downstream of proposed outfalls post-construction will contain water flows to within the recommended ranges for salmonids (see below), or lower than the highest peak velocity currently occurring at each location. Where post-construction water velocities are anticipated to be consistently higher than the recommended ranges (for example, projected long term winter runoff and surface water flows and additional discharge from the road), water flow monitoring at these locations will occur to determine the natural ranges at those points and guide the design of any required flow control measures.

5.5.7 Recommended water velocities for salmonids, taken from Ecology of the Atlantic Salmon[31] are as follows:

[31] http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=SMURF_salmon.pdf

- Spawning: 25–90 cm/s
- Nursery: Fry and underyearling 50 to 65 cm/s, yearling and older 60–75 cm/s

5.5.8 The results of the Outfall Discharge Velocity Assessment are outlined in Appendix 10. Without further knowledge of the river habitat all the outfalls in Appendix 10 will be considered to discharge to watercourses of salmonid interest and therefore sensitive to discharge velocities. Unless no salmonid interest in the watercourses is confirmed through further survey, then these outfalls will be subject to the limits on the water discharge velocities outlined above and detailed in Appendix 10.

5.6 Lighting

5.6.1 The dual carriageway will not be lit other than at the proposed junctions. Lighting will accordingly be located in the vicinity of several watercourses identified as having salmonid interest within the SACs or of tributaries and small watercourses associated with the wider River Foyle Catchment.

5.7 Temporary structures

5.7.1 Temporary clear span structures are proposed for crossing the Burn Dennet, Glenmornan, River Derg and the Fairy Water. These structures will be required for the duration of the construction of the appropriate phase (approximately 3 years).

5.7.2 During construction smaller existing watercourses will need to be crossed until the mainline of the proposed scheme is structurally complete, at which point the temporary crossing can be removed. Following discussion with Loughs Agency it has been agreed these watercourses will be crossed using single bore pipes placed in stream with suitable cover placed over the pipe.

5.7.3 Where a smaller watercourse is to be provided with a pipe culvert in the final design, this culvert will be constructed and used as the crossing during construction of the remainder of the phase.

6 The Three SACs

6.1.1 The location, extent and relationship of the three SACs to the proposed scheme is indicated in Appendix 1 - Figures 1 to 6. Details relating to the habitats and species identified as the primary reason for selection as a Natura 2000 site and qualifying habitats and species are described in Table 6.1 along with comments relative to condition and threats and ecosystem factors. The information has been obtained from the Natura 2000 data forms obtained from the Joint Nature Conservancy Committee (JNCC) website (www.jncc.gov.uk) and the National Parks and Wildlife Service (NPWS) website (www.npws.ie). The Natura 2000 data forms are enclosed in Appendix 8.

Table 6.1 Site Descriptions (from Natura 2000 data forms, and synopsis from NPWS)

Site Name	*Designation & Code*	*Qualifying Features*		*Current Conditions and Threats*	*Key Ecosystem Factors*
		Habitat	Species		
River Foyle and Tributaries	SAC UK0030320	Primary reason for site selection: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation.	Primary reason for site selection: Atlantic salmon Salmo salar The river has the largest population of Atlantic salmon in Northern Ireland, with c. 15% of the estimated spawning numbers. The majority of individuals returning are grilse (single wintering salmon), with a smaller number of spring salmon (multi-wintering salmon). Research has shown the presence of genetically distinct salmon in individual sub-catchments. Qualifying features, but not a primary reason for site selection: Otter *Lutra lutra*	The deterioration of water quality is both a local and widespread issue. Point-source pollution from urban centres and farms are an issue in localised areas with diffuse run-off of fertiliser from commercial conifer plantations in the upper catchment and intensive farming practices in the lower catchment providing a more widespread problem. Poor water quality, as a result of the above and increased sedimentation can be significant influences on populations of Atlantic salmon and otter, as well as altering the biological composition of the river ecosystem.	Species present. Population size of species. Vegetation characteristics.
River Finn	SAC IE0002301	Primary reason for site selection: Upland blanket bog	Qualifying features, but not a primary reason for site selection:	Water quality issues arise as a result of farming practices within the catchment, in particular the spreading of	Species Population size of species

Site Name	*Designation & Code*	*Qualifying Features*		*Current Conditions and Threats*	*Key Ecosystem Factors*
		Habitat	Species		
		Upland blanket bog occurs throughout much of the upland area along the river margins. The bog habitats contain a variety of bog flora, including the scarce bog moss Sphagnum imbricatum (Sphagnum austinii). Qualifying features, but not a primary reason for site selection: Lowland oligotrophic lakes There are many small lakes within the site, but of note are Loughs Finn, Belshade and Derg. Typical species are present in the lake margins and Arctic Charr Salvelinus alpinus are present in Lough Finn. Northern Atlantic wet heath with Erica tetralix The wet heaths are associated with the blanket bog throughout the site, on shallow peats and better drained slopes.	Atlantic salmon The Finn is important in an international context in that its populations of spring salmon appear to be stable while declining in many areas of Ireland and Europe. The estimated rod catch from the Finn is c. 500 – 800 spring salmon and 4,000 grilse, annually producing about 40% of the total Foyle count. Otter Otter are widespread throughout the River Finn system.	slurry and as the river is subject to extensive flooding in parts. Sedimentation and acidification are also considered to be threats to the SAC, in particular sedimentation of spawning gravels.	Extent and distribution of habitat Species, habitats, structures and characteristics of the site

Site Name	*Designation & Code*	*Qualifying Features*		*Current Conditions and Threats*	*Key Ecosystem Factors*
		Habitat	Species		
		Transitional mires Transitional mires occur at several locations, usually at the interface between bog or lake or stream. The diversity of the mires, including diagnostic species, is good.			
Owenkillew River	SAC UK0030233	Primary reason for site selection: Water courses of plain to montane levels with Ranunculion fluitantis and Callitricho-Batrachion vegetation Beds of stream water-crowfoot Ranunculus penicillatus spp. penicillatus occur throughout its middle and lower reaches, typically in association with intermediate water-starwort Callitriche hamulata and large-leaved pondweeds such as broad-leaved pondweed Potamogeton natans and shining pondweed P. lucens.	Primary reason for site selection: Freshwater pearl mussel Margaritifera margaritifera The freshwater pearl mussel population, estimated to have reached a minimum of 10,000 individuals, is confined to a 4km reach of undisturbed river channel and is the largest known population surviving in Northern Ireland. Qualifying features, but not a primary reason for site selection: Atlantic salmon Otter	Poor water quality is suspected to be a major influence on freshwater pearl mussel recruitment, affecting both adult and juvenile survival, and availability of host salmonids, required during their parasitic stage, as well as altering the biological composition of the river ecosystem. Freshwater pearl mussel is susceptible to increased sediment in the water, resulting from harvesting of conifer plantations and diffuse run-off from degenerated peatland in the upper catchment.	Species Population size of species Extent Vegetation characteristics Natural processes

Site Name	*Designation & Code*	*Qualifying Features*		*Current Conditions and Threats*	*Key Ecosystem Factors*
		Habitat	Species		
		ld sessile oak woods with Ilex and Blechnum in the British Isles. The Owenkillew River is associated with several woodlands which in combination represent one of the best examples of old sessile oak woodland in Northern Ireland. Qualifying features, but not a primary reason for site selection: Bog woodland			

7 Potential impacts and mitigation

7.1 Primary and qualifying habitats

7.1.1 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:

- loss of primary or qualifying habitat where construction of the proposed scheme will require removal of habitat within the SACs;
- loss of primary or qualifying habitat within the SACs as a result of release of sediments or other pollutants, such as oils and petrochemicals, into watercourses within or outside and upstream of the SACs during construction;
- loss of primary or qualifying habitat within the SACs as a result of the release of sediments or other pollutants associated with road related run-off at drainage outfalls into watercourses within or outside and upstream of the SACs once the proposed scheme is open to use;
- loss of primary or qualifying habitat where the proposed bridges over the River Mourne and River Derg will shade marginal and aquatic habitats beneath the structures; and
- accidental spillage resulting in contamination of watercourses within or associated with the SACs and consequent detrimental impact on primary or qualifying habitats.

Removal of habitat within the SACs

7.1.2 In case of the River Finn SAC, none of the proposed scheme is located within the SAC boundary which is coincident with the national boundary mid-stream in the River Finn as it flows west of Strabane to its confluence with the River Foyle. That part of the River Finn to the east of the national boundary forms part of the River Foyle and Tributaries SAC. There will, accordingly, be no requirement or authority under the contracts for the removal of primary, qualifying or other riverside, marginal or aquatic habitat within the SAC.

7.1.3 In the case of the Owenkillew River SAC, the proposed scheme is located some 1.8km west of the designated site at its closest. There will, accordingly, be no requirement or authority under the contracts for the removal of primary, qualifying or other riverside, marginal or aquatic habitat within the SAC.

7.1.4 In the case of the Foyle and Tributaries SAC, the requirement for removal of habitat within the SAC is limited to the removal of bankside vegetation to enable protection to be introduced at the base of the abutment walls required to support the clear-span bridges over the River Mourne and the River Derg and to facilitate the implementation of drainage outfalls into the River Finn west of Strabane. This will involve the permanent loss of some 0.04ha of bankside vegetation in the context of a total 770ha of aquatic, marginal and bankside habitats which constitute the SAC. The bankside vegetation which will be removed is not part of the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation which is cited as a primary reason for selection of the SAC.

Release of sediments or other pollutants during construction

7.1.5 Potential for loss of primary or qualifying habitats within the SACs as a result of the release of sediments or other pollutants into watercourses within or outside and upstream of the SACs during construction is limited to the Foyle and Tributaries SAC.

7.1.6 In the case of the Owenkillew River SAC, the proposed scheme is located some 1.8km west of the designated site at its closest. There is no proposed scheme construction required at any point nearer to the SAC, and no hydrological connection exists which could form a pathway for pollutants from the scheme to enter the Owenkillew (see Appendix 1 - Figures 1 to 6).

7.1.7 In case of the River Finn SAC, habitats identified as a primary reason for site selection and qualifying habitats are all located at distance upstream from the point at which construction will be required in proximity to the SAC such that there is no risk of reduction or deterioration in the extent or condition of the habitats.

7.1.8 In the case of the Foyle and Tributaries SAC the following locations are those where working areas will be located in or within 50m of the SACs:

- a 500m long section of the alignment north west of Magheramason;
- at the proposed crossing of the River Mourne;
- on the western margin of Strabane where the River Finn flows north to its confluence with the River Mourne; and
- at the proposed crossing of the River Derg.

7.1.9 Of the four locations, that at Magheramason will involve construction of a drainage pond and two drainage outlets onto a small tributary of the River Foyle approximately 50m from the northernmost boundary of the SAC. There is no *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat in this location. At the location of the proposed bridge over the River Mourne, surveys have established the presence of small areas of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat which appear to have washed down from further up-stream. It has also been established this location is notable for its unstable substrate, a status which will preclude successful establishment of viable areas of the habitat type. Works in the vicinity of the River Finn will involve construction of 6 drainage outfalls, 4 directly into the river and two into a tributary some 3km from the main river, and the establishment of embankments required to achieve the proposed vertical alignment for the dual carriageway over an 800m length immediately adjacent to the eastern bank of the river. Surveys have demonstrated there is no *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat in the river to the west of Strabane. In the case of the River Derg, the proposed location for the bridge over the main river is one where surveys have established the presence of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat. There will not be a need to remove any areas of qualifying habitat for construction of the River Mourne or River Derg crossings.

7.1.10 Construction activity will also occur where bridges, culverts, watercourse diversions and drainage outfalls are proposed on watercourses outside of the SAC but within the River Foyle Catchment. The locations where activity associated with these design components will be required are indicated in Appendix 1 - Figures 1 to 6 and Sheets 1-24. The substantial majority of locations outside of the SACs are in excess of 1km from any of the three SACs. Many are at significantly greater distance.

7.1.11 Mitigation measures focused on the avoidance and control of sediments and other construction related pollutants are detailed in the environmental commitments in the ES for the currently proposed scheme. These will be formalised in the contracts for the implementation of the project by way of contract specific Construction Environment Management Plans (CEMPs) and Silt Management Plans (SMPs) which the contractors will be required to prepare and which will include as a minimum management roles and responsibilities, protocols, method statements and mitigation measures. The draft CEMP and SMP are provided in Appendices 5 and 6. The draft SMP has been developed in consultation with Loughs Agency and both will be finalised to the satisfaction of the Loughs Agency and NIEA.

7.1.12 Pollution control measures during construction will be informed by the following guidance:

Pollution Prevention Guidance (PPG) (Joint UK Agencies)
PPG1: General Guide to the prevention of pollution;
PPG2: Above Ground Oil Storage Tanks;
PPG5: Works in, near or liable to affect watercourses;
PPG6: Working at Construction and Demolition Sites;
PPG8: Storage and Disposal of Used Oils;
PPG21: Pollution Incident Response Planning;
PPG26: Storage and Handling of Drums & Intermediate Bulk Containers
Environmental Good Practices – Working on Site C503 (CIRIA, 2000);
Control of Pollution from Construction Sites C532 (CIRIA, 2001);
Control of Water Pollution from Construction Sites – Guide to Good Practice SP156 (CIRIA, 2002);

7.1.13 Although the above Pollution Prevention Guidance (PPG) have been replaced by NIEA Standing Advice, these still represent current best practice and, where appropriate, will continue to be applied, where relevant.

7.1.14 The effectiveness of the mitigation measures delivered through the CEMP, and the SMP will be monitored via an Adaptive Monitoring Plan, in which conservative threshold targets will be set and intensely monitored over the construction period. Targets levels will be set at two levels to trigger action, namely an ‘Investigation’ level; where the source of any elevation over expected baseline variation will be determined (i.e. is it arising from the construction or from other causes, and an ‘Action’ level in which immediate mitigation will be put in place, including

the possibility that all works must cease until the cause of any increased sediment/ or contaminants is discovered, appropriately managed and water quality levels return to normal.

7.1.15 As only two areas of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat have been recorded which could potentially be affected by work within or in close proximity to the SAC, the fact that the watercourse crossings at these points (the River Mourne and River Derg) are clear span structures, and taking into account the location of the substantial majority of other working areas associated with watercourses, the risk of sediments or other construction related pollutants having a detrimental effect on primary or qualifying habitat within the SACs is low. It is a risk which is effectively reduced to negligible when the proposed mitigation measures are taken into account.

Release of sediments or other pollutants associated with road related run-off

7.1.16 Potential for loss of primary or qualifying habitats within the SACs as a result of the release of sediments or other pollutants associated with discharge of road related run-off into watercourses within or outside and upstream of the SACs once the proposed scheme is open to use is limited to the Foyle and Tributaries SAC and River Finn SAC.

7.1.17 No account has been made of the potential long term reduction in traffic related contaminants due to the introduction of current UK policy banning the sale of new petrol and diesel vehicles by 2040.

7.1.18 In the case of the Owenkillew River SAC, there are no proposals for discharge of road related run-off into the river or other watercourses within the Owenkillew River Catchment.

7.1.19 In the case of the River Finn there are 6 proposed discharges for road related run-off which will issue either directly into the river or into tributaries which in turn flow into the main river. They will discharge at a point where the river is the subject of designation as the River Foyle and Tributaries SAC and River Finn SAC either side of the national boundary which is mid-stream.

7.1.20 In the case of the River Foyle and Tributaries SAC there are 5 proposed discharges for road related run-off which will issue directly into watercourses within the SAC and 65 which will discharge into tributaries/headwaters within the River Foyle Catchment.

7.1.21 As discussed in Section 5.5, incorporation of measures to minimise sediments and pollutants into the watercourses are an integral part of the Scheme design. The drainage strategy for the proposed scheme provides for discharge of road related run-off to existing watercourses through a range of Sustainable Drainage Systems (SuDS) features focused on the interception and reduction in concentrations of sediments and other potentially harmful substances which are either suspended or in soluble form within road related run-off prior to discharge.

7.1.22 Additional measures include the use of grassed surface water channels, attenuation ponds and wetlands. Discharges will be subject to DfI Rivers approval in relation to flow volumes prior to commencement of construction.

7.1.23 The schedule of the 75 drainage outfalls in Appendix 4 also indicates the design/mitigation measures which are proposed at the various outfalls which have been included to facilitate achievement of the design parameters relative to TSS concentrations and HAWRAT parameters relative to pollutants. Additionally, the potential for increased flow velocity within the watercourse has been assessed (see Appendix 10), the detailed design will comply with requirements for salmonids as detailed in 5.5.7.

7.1.24 Discharges to watercourses have been discussed with NIEA, Loughs Agency and DfI Rivers. The results of calculations for discharges to both SACs and their associated catchments relative to the passage of fish are detailed in Appendix 4. The outfalls have been subject to a HAWRAT/EQS assessment as described in 4.2.15. These have demonstrated that all outfalls pass and that the discharges will accordingly be acceptable relative to the ecological sensitivity of the watercourses.

7.1.25 The Proposed Scheme would result in traffic moving from the existing A5 to utilise the A5 WTC. The current A5 has limited water treatment mechanisms for outfall discharges. The A5WTC will have modern water quality treatment installed on all discharge locations, which is a clear improvement on the existing drainage discharges from the current A5.

Accidental spillage

7.1.26 As with any road, there will be a risk of accidental spillage of a wide range of contaminating materials which could be potentially harmful to habitats and species within the watercourses in and associated with the SACs once construction is completed and traffic begins to use the dual carriageway. Assessments based on the application of Method D - 'Assessment of Pollution Impacts from Spillages' as detailed in HD 45/09 in Volume 11 of the DMRB were undertaken for the proposed scheme described in the A5WTC ES 2010. These demonstrated the risk, expressed as the annual probability that a serious pollution incident could occur, would be greater than 1:500 for any single drainage catchment for the proposed dual carriageway. They also demonstrated the risk would be greater than 1:1000 for cumulative spillage associated with occurrences on more than one drainage catchment at any one time.

7.1.27 Measures such as Spillage Control Penstocks will be incorporated into the drainage design at the termination chamber of mainline drainage runs and in advance of discharges to ponds, wetlands or watercourses. These penstocks will be installed to facilitate the isolation of accidental spillages on the main carriageway. The penstocks will be located in the verges of the mainline carriageway and be easily accessible and visible from the mainline carriageway. Appropriate “Pollution Control Valve” signage shall be provided.

Shading at the River Mourne and River Derg crossings

7.1.28 Taking into account the very small extent of *Ranunculion fluitantis* and *Callitricho-Batrachion* habitat which could potentially be affected by shading at the two crossings, and the adoption of open span structures, which will reduce the intensity of the shading, the risk that this will have a detrimental effect on the habitat in these locations is low. Should deterioration occur in these small areas, the effect on a combination of unstable and good examples of the habitat type in the context of the habitat relative to the designated site as a whole will be slight /negligible and not significant.

7.2 Atlantic salmon

7.2.1 The introduction of the proposed scheme into the existing mosaic of terrestrial and aquatic habitats within the River Foyle Catchment has the potential to affect Atlantic salmon as a primary reason for selection of the Foyle and Tributaries SAC and River Finn SAC and qualifying feature of the Owenkillew River SAC both where they are present within in the SACs and in watercourses within the wider catchments.

7.2.2 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:

- disturbance or harm associated with construction related noise, vibration and lighting within the SACs and wider catchments;
- disturbance or harm associated with the construction of bridges, culverts, watercourse diversions and drainage outfalls and other locations where working areas including site compounds will be within 50m of watercourses in the SACs and within the wider catchments;
- loss of habitat relied on by the species within the SACs and wider catchments;
- fragmentation as a result of obstruction or prevention of passage for the species along watercourses in the SACs and within the wider catchments once the proposed scheme is open to use;
- harm to the population of the species associated with the SACs as a result of increased concentrations of TSS and other harmful substances in watercourses associated with discharges from drainage outfalls for the proposed scheme; and
- disturbance during use as a result of road related lighting.

Construction related noise, vibration and lighting

Noise and vibration

7.2.3 Atlantic salmon are capable of detecting the pressure and particle motion components of sound; levels of anthropogenic noise and vibration may exceed the hearing threshold of Atlantic salmon (Hawkins and Johnstone, 1978). This is due to their physiological makeup and the particle composition of water and soil, which facilitate propagation further than in air (Popper, 2008). The resulting potential impacts can be hearing impairment (Nedwell et al., 2005) or death, either directly from the noise generation or indirectly as a result of hearing impairment. Construction activities associated with the proposed scheme likely to pose such a risk are blasting or piling particularly within watercourses.

7.2.4 The proposals do not require blasting or piling within watercourses. The establishment of abutment foundations at the proposed River Mourne and Rive Derg crossings will, however, involve piling close to the top of the bankside slopes at both watercourses. In light of this, discussions have been held with Loughs Agency and appropriate mitigation measures have been identified and agreed.

7.2.5 The draft CEMP includes identification of working windows for watercourses with salmonid interest. A working window of May to September has been agreed with Loughs Agency for the Derg crossing, which represents a period outside the normal salmonid spawning and incubation periods. However as downstream smolt run can occur from April to the end of May, a precautionary approach will be undertaken and the final agreed working date commencement will occur following consultation and up to date monitoring of the watercourses.

7.2.6 In the case of the River Mourne crossing the contractors will be required to utilise Continuous Flight Auger (CFA) piles. In the case of the foundations for the abutment walls at other bridges either CFA or drilled piles will be used. Therefore all piles will be rotary bored piles which do not produce significant vibration.

7.2.7 Mitigation to be incorporated in the construction procedure, for all piling within 50m of a watercourse, will include a soft -start methodology. The soft-start methodology will involve a gradual increase in force and intensity of percussive piling or drilling, and hence, noise and vibration, over a 30 minute period to allow Atlantic salmon to move outside of the area of influence. The soft-start methodology would be required each time the machinery is started following a 30 minute rest period. Once the piling is in full operation, associated noise and vibration from the machinery will keep fish outside of the area of influence. This process will need to be repeated at the start of each day, as overnight working is not proposed for construction works in close proximity to watercourses.

Lighting

7.2.8 Artificial lighting at night has the potential to disrupt and disorientate fish, increase exposure to predation, alter light-sensitive endocrine systems and disrupt crepuscular and nocturnal mating, signalling and dispersal (Rich and Longcore, 2006). With regards to Atlantic salmon, the main impacts resulting from artificial lighting are disruption to migration behaviour (Thorpe et al., 1988; Nemeth and Anderson, 1992) and increased mortality rates due to increased efficiency of predators (Tabor et al., 2004; Kemp and Williams, 2009).

7.2.9 Night working in the vicinity of watercourses identified as being of salmonid interest will not generally be allowed. However, circumstances may arise which require emergency works outside of daylight hours, in these cases lighting will be positioned/cowled to minimise light spill onto the watercourse and the duration will be kept to a minimum. These approaches will be contractual commitments placed on contractors by DfI, which will be audited as part of DfI standard practice.

Disturbance or harm associated with construction

Release of sediment or other construction related pollutants into watercourses

7.2.10 Construction related to earthworks and structures can involve in the release of sediments and other construction related pollutants into watercourses. In the context of the proposed scheme this could result in loss of spawning and nursery habitat used by Atlantic salmon and direct harm to the species as a result of concentrations of sediments and other pollutants in the water.

7.2.11 The risk of release of sediments or other construction related pollutants into watercourses within the SACs or the wider catchments associated with the SACs will be limited to the Foyle and Tributaries SAC and River Finn SAC. There are no works required in or close to the Owenkillew River SAC.

7.2.12 In the case of the Foyle and Tributaries SAC and River Finn SAC and their wider catchments the risk will occur where:

- localised in-stream works and works on the bankside of watercourses will be required for the construction of temporary and permanent bridges, culverts, watercourse diversions and headwalls for drainage outfalls;
- construction of earthworks to establish the vertical alignment for the proposed scheme is located within 50m of the watercourses;
- construction of filter drains, ditches, swales, grassed channels and wet and dry ponds is required to attenuate and carry road related run-off to drainage outfalls; and
- site compounds and materials storage areas are located close to watercourses.

7.2.13 The installation of rip-rap to protect bridge abutments will require the placing of rock-filled gabion mattresses on the profiled and consolidated banks at the base of bridge abutments. The design of the gabion mattresses will take into consideration both the water quality and the speed or energy of the watercourse. Both of these factors will be used to inform on the gauge and corrosion characteristics of the gabion mesh. It is recognised that where there is a potential risk of impact from river debris it is recommended that a heavier mesh face material is used. Furthermore, to ensure that the integrity of the rock-filled gabion mattresses is maintained throughout its design life, a regime of inspections in accordance with BD63/07[32] will be implemented. Measures and requirements detailed in Annex 2.4 of the draft CEMP in Appendix 5 of this report will be adhered to minimise potential sediment release into watercourses to negligible levels. Contractors will also be required to ensure imported rock does not contain invasive species of plant.

7.2.14 The temporary bridges over the Burn Dennet, Glenmornan, River Derg and Fairy Water will be clear span temporary bridge structures that will be installed at a level which allows for flood water to pass underneath, and does not block movement of animals along the watercourse corridor.

7.2.15 The installation of culverts and watercourse diversions will result in disturbance to watercourse channels and banksides and could result in consequent release of sediments into the watercourses. The proposed method of construction whereby culverts on diverted sections of watercourse will be completed prior to abandonment of the relevant section of existing channel, and temporary sections of diverted watercourse will be provided along

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watercourses where culverts are to be constructed on-line, will substantially limit potential release of sediments into waters of salmonid presence or potential.

7.2.16 As illustrated in Appendix 1 - Figure 7 headwalls will generally be of concrete construction. The area which will be subject to disturbance and the volumes of soils which will require to be excavated will be small. Excavated soils will be temporarily set aside a minimum of 10m from the top of the bankside and any not required for reinstatement of the bankside will be removed from site once reinstatement of the bankside profile is completed. The activity is one which will be of short duration.

7.2.17 The risk will be greater where outfalls are required on smaller tributaries and headwaters with relatively low volumes of flow. In these locations the works will be programmed for implementation at times of lowest flow between May and September.

7.2.18 Spillage of fuels and oils associated with machinery required for earthworks and installation of the structures could result in release of hydrocarbons in all of the above locations. The presence of cement in storage prior to use and release of such contaminants into watercourses as structures are built could result in mortality or harm where the watercourses are used by Atlantic salmon.

7.2.19 The Water Framework Directive identifies a requirement for suspended solids levels to be kept below 25mg/l for fish species to thrive. However, Loughs Agency have raised concerns that the risks associated with sediments relative to Atlantic salmon will be greater during construction rather than during use of the proposed scheme upon completion of construction. The Agency's concern particularly relates to the proximity of work activities where sediments will be generated and potentially released into parts of the watercourses where there is spawning and nursery habitat and has stipulated a requirement for a more stringent standard during construction above background levels in such locations.

7.2.20 Mitigation measures have accordingly been discussed with Loughs Agency which are focused on the achievement of both thresholds in accordance with the status of the watercourses as ones used for fish passage and ones where salmonid nursery and spawning habitat is present. The measures have been formalised in Section 2 of the draft SMP provided in Appendix 6 and will be a mandatory requirement of the contract-specific SMPs which contractors will be required to prepare agree with DfI and Loughs Agency prior to the commencement of works.

Loss of supporting habitat

7.2.21 Where bridges, culverts, watercourse diversions and headwalls for drainage outfalls are proposed there will be a permanent loss of habitats other than primary and qualifying habitats which are relied on by Atlantic salmon. These include marginal habitats with overhanging vegetation and reduced flows which are important for fish migration as they provide areas of cover under which to rest. They also provide protection from predators and direct sunlight.

Open span bridges

7.2.22 The proposed open span bridges will involve the permanent loss of the bankside vegetation beneath the open span structures. The loss will include grassy banks, scrub and overhanging trees. In the context of each of the watercourses crossed, the length and scale of the watercourses and extent of salmonid habitat associated with each watercourse, the loss will be negligible. To ensure that in stream vegetation habitat loss is minimised pre-planted coir rolls of suitable native emergent and marginal vegetation will be inserted into the rip-rap during construction. In addition, suitable bankside planting will be undertaken where possible. Where open span bridges are installed at major watercourse crossings, there may be an impact from the shade cast by the bridge on in-stream habitats. This shade could reduce the ability of the habitats to thrive, and could result in a minor reduction in primary production within the watercourse.

Culverts

7.2.23 The proposed culverts will involve the permanent loss of supporting habitats where the culverts are aligned beneath the proposed dual carriageway and its supporting earthworks. The surveys undertaken during 2012 and 2013 by WSP and Loughs Agency have established that a total of 70 culverts will be located on watercourses classified as being of salmonid potential. In line with the precautionary approach adopted during the preparation of this initial information, these are currently assumed to be of importance to Atlantic salmon and will comprise box culverts as described in Table A2.1.

7.2.24 The proposed culverts vary in length from 25m to 110m. Most do not exceed 60m. The total length of culvert, and hence the length over which bankside, marginal and in-stream habitat will be permanently lost is some 3.4km. 14 salmonid watercourses have more than one culvert proposed, with 12 of these requiring 2 culverts and 2 requiring 3 culverts.

7.2.25 There will be a permanent loss of some 6.8km of marginal and bankside habitat[33] in the context of in excess of 300 km of watercourse where salmonid presence / potential has been established.

7.2.26 Proposed mitigation provides for the introduction of bankside planting reflecting that which will be lost within the vested land upstream and downstream of each culvert which will in some instances enhance the tree, scrub and grassland habitats as sources of food and shade at resting places.

7.2.27 Initial loss of in-stream habitat, primarily comprising gravels and boulders, will be largely mitigated as a result of the proposals relating to the embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures.

[33] Taking the precautionary approach that both banks have suitable habitat for the length lost, i.e.3.4km x 2

Watercourse diversions

7.2.28 The 56 proposed watercourse diversions of watercourses with salmonid interest will involve the permanent loss of supporting habitats along some 10km of existing sections of watercourse which will be abandoned. The lost habitat will, however, be re-established as part of the construction of the new sections.

7.2.29 This will involve the replication of bed and channel characteristics of the watercourses and planting of marginal and bankside habitat which will reinstate the ecological characteristics of the original watercourse along the diversions on which they are located. It will also be a specific requirement of the contracts that construction of the new sections must be completed prior to the closure and abandonment of the diverted section. The de-watering of the abandoned sections will be carried out under supervision of an ecological clerk of works to ensure fish which may be present, including salmon, are safely removed.

Habitat Fragmentation

7.2.30 The introduction of bridges and culverts along watercourses associated with the three SACs and used by Atlantic salmon could potentially obstruct or discourage passage of the fish as they seek to return to spawning areas and migrate to sea. The following design and mitigation measures which include advice detailed in River Crossings and Migratory Fish: Design Guidance' (Scottish Executive 2000) have accordingly been incorporated into the proposals:

- provision of oversized box culverts along watercourses identified as being of importance to salmonids;
- diversion of watercourses to facilitate the introduction of a shorter culvert, with lower flow velocity downstream and better light penetration, at or close to right angles to the proposed scheme carriageways where the angle of crossing would otherwise be overly long or steep;
- avoidance of steps in the vertical profile through culverts and along associated diverted watercourses;
- avoidance of bends in culverts which could initiate the deposition of debris and obstruct passage;
- adoption of vertical profiles through the culverts relative to length in accordance with Table 5.1 of the guidance; and
- provision of resting areas upstream and downstream of the culverts.

7.2.31 The proposals recognise that during periods of low flow many of the smaller watercourses which feed into the main rivers and principal tributaries and in the upper parts of the catchment have little depth of water. The design proposals described in 5.3.3 and 5.3.4 which require embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures, make

specific provision for these locations but will also be required wherever box culverts are proposed in light of salmonid presence / potential.

Road related lighting

7.2.32 All new lighting will involve the use of full spill cut-off luminaires which will contain the extent of spill within the dual carriageway footprint. Luminaires on the existing Mourne River bridge and associated with the existing A38 approach and bridge linking the existing A5 and Lifford will also be replaced with full spill cut-off units such that the extent of spill associated with the existing bridge will be reduced. This combination of proposals will result in a slight improvement relative to light and the passage of salmon in this location.

7.3 Freshwater pearl mussel

7.3.1 Freshwater pearl mussel is cited as a primary reason for selection for the Owenkillew River SAC. The species is not cited either as a primary reason for selection or as a qualifying species for the River Foyle and Tributaries SAC or the River Finn SAC. The screening for the SAC concluded the proposed scheme will not have a direct impact on the population of the species which form the focus of the Owenkillew River SAC's selection, that being located some 20km upstream and east of the proposed alignment.

7.3.2 Any impacts that result in a decrease in anadromous[34] salmonid populations (Atlantic salmon and sea trout) could, however, have a significant impact upon the viability of the freshwater pearl mussel population within the SAC. The lifecycle of freshwater pearl mussel is reliant upon the development of glochidia which attach to the gills of host fish, usually juvenile salmonids, to continue development (Skinner et al., 2003). Therefore, a decline in the salmonid population within the Owenkillew River, as a result of construction and operational disturbance to migration, could have an impact upon the future viability and population size of freshwater pearl mussel. The sensitivity of the freshwater pearl mussel population, currently confined to a 4km stretch of undisturbed river channel in the upper reaches and the largest known population surviving in NI, is highlighted in the relative absence of mussels below 10 years in age found in surveys (NIEA, 2005) and data suggesting most individuals are in excess of 50 years old (Beasely et al., 1998).

7.3.3 The assessments for salmonid species associated with the Owenkillew which are dependent on the River Foyle, River Mourne and River Strule to its confluence with the Owenkillew River have demonstrated the proposed scheme will not have a significant effect on the passage of the fish on which the pearl mussel is dependant or on the habitats which support the fish.

7.4 Otter

7.4.1 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:

- disturbance and harm as a result of construction;

[34] Anadromous fish are those which travel from the sea to freshwater rivers to spawn.

- loss of habitat and a reduction in available food resources;
- fragmentation associated with obstruction of existing access along watercourses resulting in potential mortality or harm where otters seek to cross carriageways;
- deterioration in water quality resulting in harm to the species and consequent impacts on supporting habitat.

Disturbance and harm during construction

7.4.2 Sources of potential impact during construction include:

- disturbance as a result of night time working which could result in the species being discouraged from using their natural range with consequent impact on the health of the animals through increased stress and reduced feeding efficiency and separation of breeding males and females which could lead to a reduction in the density and distribution of the species.
- disturbance to movement along watercourses where work is being undertaken along or close to watercourses
- disturbance in the vicinity of breeding habitat which could lead otter to abandon cubs or to move them too early and thus place them in danger of death or starvation.
- open excavations with steep sides in close proximity to watercourses may trap otter and result in death of individuals.

7.4.3 Night time working will not be permitted adjacent to watercourses where the presence of otter is confirmed by way of further surveys which will be undertaken in advance of construction.

- Other mitigation measures which have been identified in light of the identified impacts and which have been included as part of the environmental commitments in the ES for the currently proposed scheme include (see Appendix 7 of this Report for further details of NIEA agreed otter mitigation): location of compounds and storage of materials away from watercourses;
- fencing off of riparian habitat that is to be retained with clear marking to prevent inadvertent access;
- exclusion of otters from works areas near watercourses where use by the species has been established;
- fencing or covering of excavations in excess of 2m depth over-night in the vicinity of watercourses where use by the species has been established;
- provision of a suitable ramp within all uncovered excavations during non-working hours; and

- inclusion of a contractual requirement for contractors to provide details for temporary means of continued passage along relevant watercourses during construction in location specific method statements pending the incorporation of permanent means of passage in the completed works.

7.4.4 In common with Atlantic salmon, sediments and other construction related pollutants can result in harm to otter and supporting habitat. Mitigation and control measures proposed to control sediment and other potentially polluting materials, such as fuels, oils and cement, as specified in the CEMP and SMP, will serve to avoid such impacts or limit them such that the effect will be negligible relative to the species and its supporting habitat. The specification provided within the scheme CEMP and SMP is the minimum requirement that the contractor must meet or exceed. Works will not be allowed to progress in these areas until DfI has signed off contractor's documents in this regard. As with water quality monitoring, intensive monitoring of the effectiveness of these measures is proposed via an Adaptive Monitoring Plan which will be implemented by a qualified Ecological Clerk of Works (ECoW).

Habitat loss

7.4.5 The surveys undertaken prior to the publication of the A5WTC ES 2010 identified two holts within the land take for the proposed scheme (River Derg, Ch. 34000; and Fairy Water, Ch. 50000) and three habitat areas as having potential to support breeding otter (Strabane Nature Reserve, Ch. 17500; Beltany Lodge Ch. 41900; and Routing Burn Ch. 71700). In keeping with the findings of the A5WTC ES 2016, the currently proposed scheme will not involve damage and destruction of the habitat at Beltany Lodge but will involve damage and loss of approximately 1ha of identified breeding habitat at the Strabane Nature Reserve. Additional survey work undertaken in 2012 confirmed that otter were not using the site at Routing Burn for resting or breeding and are reported within the 2016 ES.

7.4.6 In addition to the holts and breeding habitat identified, the construction of the proposed scheme will involve the loss of localised and small areas of marginal and bankside habitat along some 14 watercourses (see Table A7.1 in Appendix 7) within the wider catchment associated with the SACs where use by otter was confirmed in the 2013 surveys. The extent of riparian habitat lost is not likely to be significant when considering the extent of otter home ranges, which can extend over tens of kilometres (Chanin, 2003), and the fact that the loss is spread out over a number of sites in a wide geographical area. In the context of the extent of the habitats as they are represented throughout the relevant parts of the catchment these localised and small losses will not constitute a material risk to the species by virtue of a material deterioration in the availability and continuity of supporting habitat.

7.4.7 Mitigation measures which have been identified in light of the identified impacts and which will be included amongst the environmental commitments in the ES for the currently proposed scheme are described below (see Appendix 7 for further details of NIEA agreed otter mitigation).

7.4.8 With regard to potential breeding sites, a procedure to be followed prior to the commencement of construction activities has been written, which involves monitoring of the woodland for evidence of breeding or nurturing of young (see Appendix 7). If any evidence of this is found

within the woodland, works will be delayed until the cubs have left the den, at which point the mother will move them to a holt closer to the water. Once it has been identified that otter have finished using the site for breeding or nurturing of young, clearance of the site would be permitted under the strict supervision of a suitably qualified Environmental Clerk of Works.

7.4.9 Pre-construction update surveys will be carried out to maintain the validity of species data. The presence of any holt which shows signs of current use will be the subject of a location specific mitigation strategy which will be developed in consultation with NIEA and which will be incorporated into a required licence application. Such strategies will include measures to passively and sensitively displace otters from the holts after compensation measures have been implemented to take account of the lost resting place, such as artificial holts.

7.4.10 An artificial holt will be created in the vicinity of the River Derg at Ch.34400 and mammal fencing will be installed along the proposed road boundary at this location. However, the artificial holt would be located within the construction site until works are complete and therefore additional mitigation measures would be required to assure otter safety. The artificial holt will consist of a number of chambers (up to $1m^2$) and will be constructed from breeze blocks or log piles for walls and covered in logs with brash for the ceiling. There will be at least one chamber that has no external opening. There will be at least two concealed entrances, one into the river and one onto the bank.

7.4.11 Specific pre-construction surveys will be carried out at Strabane Nature Reserve, Ch.17500, Beltany Lodge Ch.41900 and Routing Burn Ch.71700 to establish whether the woodlands support a breeding site prior to construction. If evidence of breeding activity, or the care of young, is found, no construction works will be carried out at these locations until the cubs have left the den, which can be up to ten weeks. When it can be ascertained that otters are not using the sites for breeding or care of young, vegetation will be cleared as soon as possible. Suitable fencing will then be erected along the remaining woodland edges as screening from construction activities. The results of these surveys will be used to inform any European Protected Species licence application.

7.4.12 Vegetation in suspected breeding/resting areas will be cleared under the supervision of a suitably experienced ecologist. Toolbox talks will be provided to site staff which will provide information on where the species may be found and how to avoid impacts. If otters are at risk of injury from the works, site staff would be instructed to cease working and contact the ecological supervisor.

7.4.13 If any additional otter holts are found before or during construction within or near to the works site then an ecologist would be notified immediately and works would cease within at least 30m of the holt. The ecologist would determine if the holt is in current use. For any active holts the NIEA would be contacted. A licence would likely be required before any mitigation or works can be undertaken. If a natal den is found after construction has started then an ecologist would be notified immediately and works would cease within at least 100m of it, whilst the best way to proceed is determined. Finding any type of otter holt or natal den could significantly delay the works whilst mitigation is implemented.

7.4.14 Supplementary planting will be undertaken adjacent to the Strabane Nature Reserve site, with circa 1ha of woodland on land adjacent to the northbound carriageway. This planting will be suitable otter breeding habitat, reducing the impact of this habitat loss and ensures the habitat remains a viable breeding area for otter.

7.4.15 Mitigation is proposed for the loss of resting sites with the provision of artificial holts at both locations where holts are beneath the footprint of Phase 2 of the proposed scheme. The artificial holts are proposed to be constructed prior to the destruction of the existing holts, which will take place under a NI European Protected Species (EPS) Development Licence. Alternative mitigation has been included for the Fairy Water holt, which involved moving the route alignment by 5m to avoid destruction of the holt. Discussion with Dr Paul Chanin (Pers comm. 2013) indicated that otter would not be significantly affected by the presence of the construction site in this proximity to the holt.

7.4.16 Notwithstanding this, proposals have been included in the planting and ecological mitigation measures as confirmed in the environmental commitments in the ES for the currently proposed scheme. These will serve to enhance the marginal and bankside habitats upstream and downstream of the culverts, watercourse diversions and outfalls where the removal of existing habitat will be required. The resultant impact will be at worst slight and not significant relative to the species.

7.4.17 The impacts of the proposed scheme in relation to otter prey species are unlikely to have a significant effect on otter as the salmonid population will be safeguarded by the design and mitigation included within the proposed scheme.

Habitat Fragmentation

7.4.18 The fragmentation of habitats is a common threat to otter, but of greater concern where associated with roads (Harris et al., 1995; Kruuk, 1995). Death of otter as a result of road death is thought to be the predominant cause of non-natural mortality in the species (Green, 1991; O'Sullivan and FitzGerald, 1995; Philcox et al., 1999; Chanin, 2006), with the number of deaths as a result of road traffic accidents thought to be increasing (Körbel, 1994; Green & Green, 1997).

7.4.19 The proposed scheme incorporates tunnels or ledges for otter passage adjacent to culverts across the Foyle catchment, with the requirement for these otter passes determined by the distribution of otter and otter field signs found during the ecological assessments of the proposed scheme. Further to these, all of the major watercourses within the Foyle catchment (see paragraphs 5.3.1-5.3.2) have clear-span structures proposed which provide suitable and safe passage across the proposed scheme without forcing otter to cross the road.

7.4.20 Forty-four culverts are proposed specifically for otter, a further 22 tunnels or ledges are proposed for other wildlife adjacent to watercourses. Tunnels and ledges associated with watercourse crossings would fulfil the same requirements as dry otter tunnels. There are also 10 bridges over larger watercourses, where passage will be maintained during a 1 in 5 year flood event. In total, there are 76 proposed crossings suitable for use by otter within the Foyle and Blackwater Catchments.

7.4.21 As agreed with NIEA, DfI commits to maintaining otter passage, providing either pipes, ledges or redirection to a suitable crossing point. The potential for otter to use existing culverts for safe passage will be investigated, with alternatives identified where use of existing culverts is unlikely to be safe.

7.4.22 Tunnels will be 600mm diameter pipes if less than 20m long and 900mm pipes if over this length, with suitable fencing to guide otter into the tunnel entrance, and ensure that otter do not access the mainline at the watercourse crossing point.

7.4.23 Otter ledges will be installed with a clearance that is 150mm above the 1 in 25 return period flood level whilst allowing for 600mm of headroom (however where this is not possible with culvert design the headroom can be lowered to 300mm). The ledges will either be pre-cast into the culvert or will be a bolt on design using metal brackets and wooden planks or mezzanine flooring sections. The ledge will be of 500mm width and positioned so as to be accessible from the bank and the water.

Table 7.1 Otter Impact and Mitigation Summary

Potential Impact	*Mitigation Outline*	*Is mitigation non-controversial Y/N*	*Residual Impact – Significant Y/N*
Disturbance/harm during construction	Works control measures, CEMP, Clerk of Works.	Y	N
Loss of habitat/reduction in available food	Works control measures, derogation licencing for certain operations, coordination with NIEA, bankside and other mitigation planting, holt creation.	Y	N
Fragmentation of habitat	Provision of crossing points, tunnels, ledges etc.	Y	N
Deterioration in water quality	During construction – CIRIA and PPG guidance followed, Clerk of Works etc. Operation – drainage design compliant with water quality preservation.	Y	N

7.5 In-combination Effects

7.5.1 The Habitats Directive, NI Regulations and ROI Regulations require consideration to be given to potentially combined effects of a development project and other projects on Natura 2000 sites. Two proposed development projects, which have either been approved in outline or fully

approved in accordance with the relevant development consent regime for the form of development proposed, have been considered to date in the context of this requirement for the currently proposed A5WTC:

- N14/N15 Lifford Link Road; and
- Three Rivers mixed use development at Strabane.

7.5.2 The focus of the Lifford Link Road scheme is a viaduct crossing from Tyrone to Donegal between J7 on the proposed A5WTC and a new junction on the N15 in Donegal south west of Lifford. The design of the viaduct provides for a clear span over the River Finn and its banks which is designated as the River Finn SAC and River Foyle and Tributaries SAC either side of the national border which is located mid-stream. An Environmental Impact Statement as required by the ROI Regulations has been completed (The N14 / N15 to A5 Link, Environmental Impact Statement/Environmental Statement Non-Technical Summary 2011), as has a Natura Impact Statement (NIS) reporting the findings of the appropriate assessment. The EIS/ES and NIS conclude that based on the design and proposed mitigation measures relating to pollution control the proposed scheme will have no impact on otter and Atlantic salmon as species cited as a primary reason for selection of the designated river, and no adverse effect on the integrity of the SACs.

7.5.3 The Three Rivers development proposal lies within the floodplain of the River Foyle at Strabane. Proposals for the mixed use leisure and employment project include re-alignment of the flood defences and culverting of a section of a minor watercourse. The A5WTC does not involve work relative to these areas associated with the river and River Foyle and Tributaries SAC either directly or indirectly, though it does involve the introduction of the proposed open span bridge over the River Mourne, a proposal which is close to but independent to the proposed leisure and employment development. The assessments undertaken relative to the proposed Mourne Bridge have demonstrated, that with the adoption of an open span structure and inclusion of pollution control and noise mitigation measures as part of the contracts for the works, the implementation of the proposed bridge will not have a significant effect on habitats or species of primary or qualifying importance to the SAC. The proposed scheme will accordingly not have any in combination effects with the 3 Rivers development proposal relative to the SAC.

7.5.4 There are no other reasonably foreseeable projects that would interact with the A5WTC at this stage.

7.6 Adaptive Monitoring

7.6.1 As discussed above (7.2.14), the effectiveness of the mitigation measures delivered through the CEMP and the SMP will be monitored via an adaptive monitoring plan, in which conservative threshold targets will be set and intensely monitored over the construction period. The two target levels (Investigation and Action) will be agreed with NIEA and Loughs Agency, which will identify criteria against which monitoring would be undertaken both during construction and over an agreed period post construction. Climate change forecasts will be reviewed, consistent with any updates by the UK Climate Change Panel. Appropriate remedial

measures would be put in place as required in relation to the findings of the monitoring so as to achieve the objectives of the proposed measures.

8 Summary

8.1.1 The River Foyle Tributaries SAC, River Finn SAC and Owenkillew River SAC have been identified as Natura 2000 sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Habitats Directive, as transposed by the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland as amended by European Communities (Natural Habitats) (Amendment) Regulations, 2005.

8.1.2 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'.

8.1.3 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for all three SAC's:

- that the Proposed Scheme is a project which is not connected with or necessary to the management of the implicated SACs;
- that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of the designated sites and associated watercourses, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
- that a Stage 2 Appropriate Assessment should be undertaken.

8.1.4 Following the Stage 2 Appropriate Assessment it is concluded:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design;
- Additional mitigation, including an adaptive monitoring programme will be put in place both during construction phase and over an agreed period post-construction; which will also consider the implication of any update in climate change forecasts; and

- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the SACs.

8.1.5 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the three sites either independently or in combination with other projects.

9 References

Alabaster, J.S. and Lloyd, R. (1982) Water quality criteria for freshwater fish. Butterworths, 297pp.

Beasley, C. R., Roberts, D. and Mackie, T. G. (1998) "Does the freshwater pearl mussel *Margaritifera margaritifera* L., face extinction in Northern Ireland?" Aquatic Conservation: Marine and Freshwater Ecosystems 8 pp 265-272.

Bruton, M. N. (1985) The effects of suspensoids on fish. Hydrobiologia 125 pp 221 – 241.

Chanin, P. (2003) Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

Chanin, P. (2006) Otter Road Casualties. Hystrix Italian Journal of Mammalogy. 17 (1) pp 79 - 90.

Chapman, D. W. (1988) Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117 pp 1 – 21.

Crabtree, B., Dempsey, P., Moy, F., Brown, C., and Song, M. (2007b) Improved determination of pollutants in highway runoff phase 2 stage 3 report. WRc Report UC7309.

Crisp, D. T. (1996) Environmental requirements of common riverine European salmonids fish species in fresh water with particular reference to physical and chemical aspects. Hydrobiologia 323, pp 201-221.

Department of Finance and Personnel (2006) A Sustainable Development Strategy for NI – first steps towards sustainability. The document can be found at: http://www.ofmdfmni.gov.uk/sustain-develop.pdf

Department for Regional Development in NI (2008) 'Shaping Our Future' - Adjustments to the Regional Development Strategy (RDS) 2025

Derry City Council (2008) Wildlife Action in Derry ~ Londonderry 2008 – 2013 Derry ~ Londonderry Local Biodiversity Action, Derry City Council, Derry.

Design Manual for Roads and Bridges (DMRB) Standard HD 44/09. Assessment of implications (of Highways and/or Roads projects) on European sites (including Appropriate Assessment). Volume 11, Section 4. Full text found at: http://www.standardsforhighways.co.uk/dmrb/index.htm

Design Manual for Roads and Bridges (DMRB) (2010) Volume 10 Section 4, Part 4 – HA 81/99 Nature Conservation Advice in Relation to Otters

DMRB (2008a) Volume 11 Section 2, Part 1– HA 201/08 Environmental Impact Assessment

DMRB (2008b) Volume 11 Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects

European Commission (2000) Managing Natura 2000 Sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

European Communities (Natural Habitats) (Amendment) Regulations, 2005.

European Council (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

European Court of Justice (2004) Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Case C-127/02. European Court reports 2004 Page 00000

Green, R. (1991) The impact of hunting, poaching and accidents on otter survival and measures to protect individual animals. Proceedings of the V International Otter Colloquium (eds Reuther, C. and Röchert, R.) Habitat 6, pp 171 - 190.

Green, R. and Green, J. (1997) Otter Survey of Scotland 1991 – 1994. The Vincent Wildlife Trust, London.

Harris, S., Morris, P., Wray, S. and Yalden, D. (1995) A Review of British Mammals: Population Estimates and Conservation Status of British Mammals Other Than Cetaceans. Joint Nature Conservation Committee, Peterborough, UK.

Hawkins, A. D. and Johnstone, A. D. F. (1978) The hearing of the Atlantic salmon *Salmo salar*. Journal of Fish Biology 13 (6) pp 655 – 749.

Hawkins, A. D. and Smith, G. W. (1986) Radio tracking observations of Atlantic salmon (Salmo salar L.) ascending the Aberdeenshire Dee. Scottish Fisheries Research Report 36 (24).

Hellawell, J. M, Leatham, H. and Williams, G. I. (1974) The upstream migratory behaviour of salmonids in the River Frome, Dorset. Journal of Fish Biology 6, pp 729-744.

Hendry, K. and Cragg-Hine, D. (2003) Ecology of the Atlantic Salmon. Conserving Natura 2000 Rivers Ecology Series No. 7. English Nature, Peterborough.

HMSO (1995) The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995

Joint Nature Conservation Committee (2009) Annex I Habitat Accounts – Freshwater habitats – 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation. Accessed through www.jncc.gov.uk on 06th October 2009.

Joint Agencies. Department of Food Environment and Rural Affairs (DEFRA), Department of Environment and Climate Change (DECC), Met Office, Environment Agency (EA) 2016. Is UKCP09 still an appropriate tool for adaptation planning? Land Projections April 2016

Kemp, P. S. and Williams, J. G. (2009) Illumination influences the ability of migrating juvenile salmonids to pass a submerged experimental weir. Ecology of Freshwater Fish 18 pp 297 – 304.

Körbel, O. (1994) Hindering otter (Lutra lutra) road kills. Part I. IUCN Otter Specialist Group Bulletin 11 pp 14 - 22.

Kruuk, H. (1995) Wild otters: Predation and Populations. Oxford University Press, Oxford.

Loughs Agency (2009) River and Tributaries Status Reports 2009. Accessed through www.loughs-agency.org on 15th December 2010

Mouchel (2010a) A5 Western Transport Corridor Environmental Statement Volumes 1 to 3. Document Ref 718736-3000-R-008

Mouchel (2010b) A5 Western Transport Corridor Watercourse SAC Screening Report. Document Ref 718736-3000-R-006

Murphy, J.M., Sexton, D.M.H., Jenkins, G.J., Boorman, P.M., Booth, B.B.B.,Brown, C.C., Clark, R.T., Collins, M., Harris, G.R., Kendon, E.J., Betts, R.A.,Brown, S.J., Howard, T. P., Humphrey, K. A., McCarthy, M. P., McDonald, R. E.,Stephens, A., Wallace, C., Warren, R., Wilby, R., Wood, R. A. (2009), UK Climate Projections Science Report: Climate change projections. Met Office Hadley Centre, Exeter.

Nedwell, J. R., Lovell, J. M. and Turnpenny, A. W. H. (2005) Experimental validation of a species-specific behavioural impact metric for underwater noise. Proceedings of the 50th Meeting of the Acoustical Society of America/NOISE-CON 2005, 17-21 October 2005, Minneapolis, Minnesota.

Nemeth, R. S. and Anderson, J. J. (1992) Response of Juvenile Coho and Chinook Salmon to Strobe and Mercury Vapour Lights. North American Journal of Fisheries Management 12 pp 684 – 692.

NI Biodiversity Group (2002) NI Biodiversity Strategy. Environment and Heritage Service, Belfast.

NI Biodiversity Action Plan (NIBAP) (2005) Full texts for all habitats referred to available at: http://www.ni-environment.gov.uk/biodiversity/hap_uk/hap_ni.htm

Northern Ireland Environment Agency (NIEA) (2005) Northern Ireland Species Action Plan, Freshwater Pearl Mussel *Margaritifera margaritifera*. Accessed through www.ni-environment.gov.uk on 15th October 2009.

O'Sullivan, W. M. and FitzGerald, R. D. (1995) A national survey of otter mortality in Ireland. Proceedings VI International Otter Colloquium Pietermaritzburg 1993 (eds Reuther, C. and Rowe-Rowe, D.) Habitat 11, pp 96 - 101.

Office of the Attorney General (ROI) (1997) S.I. No. 94/1997 European Communities (Natural Habitats) Regulations 1997 (as amended)

Omagh District Council (2008) Omagh District Local Biodiversity Action Plan, Omagh District Council, Omagh

Ottino, P. and Giller, P. (2004) Distribution, density, diet and habitat use of the otter in relation to land use in the Araglin valley, southern Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 104b, pp 1 - 17.

Philcox, C. K., Grogan, A. L. and MacDonald, D. W. (1999) Patterns of otter *Lutra lutra* road mortality in Britain. Journal of Applied Ecology 36, pp 748 - 762.

Popper, A. N. (2008) Effects of Mid- and High-Frequency Sonars on Fish. Contract N66604-07M-6056, Naval Undersea Warfare Centre Division, Newport, Rhode Island.

Preston, J., Prodöhl, P. Portig, A. and Montgomery, I. (2006) Reassessing Otter *Lutra lutra* distribution in Northern Ireland. Environment and Heritage Service Research and Development Series No. 06/24.

Preston, S. J., Portig, A. A, Montgomery, W. I., McDonald, R. A., Dick, J. T. A. and Fairley, J. S. (2007) Temporal and Spatial Variation in Otter *Lutra lutra* diet in Northern Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 107B, 2, pp 61 - 66.

Rich, C. And Longcore, T. (eds) (2006) Ecological Consequences of Artificial Night Lighting. Island Press, Washington DC, USA.

Ryan, P. A. (1991) Environmental effects of sediment on New Zealand streams: A review. New Zealand Journal of Marine and Freshwater Research 25 pp 207 – 221.

Scottish Executive (2000) River Crossings and Migratory Fish: Design Guidance. Accessed through http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp on 7th November 2008.

Skinner, A., Young, M. and Hastie, L. (2003) Ecology of the Freshwater Pearl Mussel. English Nature, Peterborough, UK.

Suttle, K. B., Power, M. E., Levine, J. M. and McNeely, C. (2004) How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. Ecological Applications 14 (4) pp 969 – 974.

Tabor, R. A., Brown, G. S. and Luiting, V. T. (2004) The effect of light intensity on sockeye salmon fry migratory behaviour and predation by cottids in the Cedar River, Washington. North American Journal of Fisheries Management 24 pp 128 – 145.

Thorpe, J. E., Morgan, R. I. G., Pretswell, D. and Higgens, P. (1988) Movement rhythms in juvenile Atlantic salmon, *Salmo salar* L. Journal of Fish Biology 33 pp 931 – 940.

Appendices

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Appendix 1: Sheets 1 to 24

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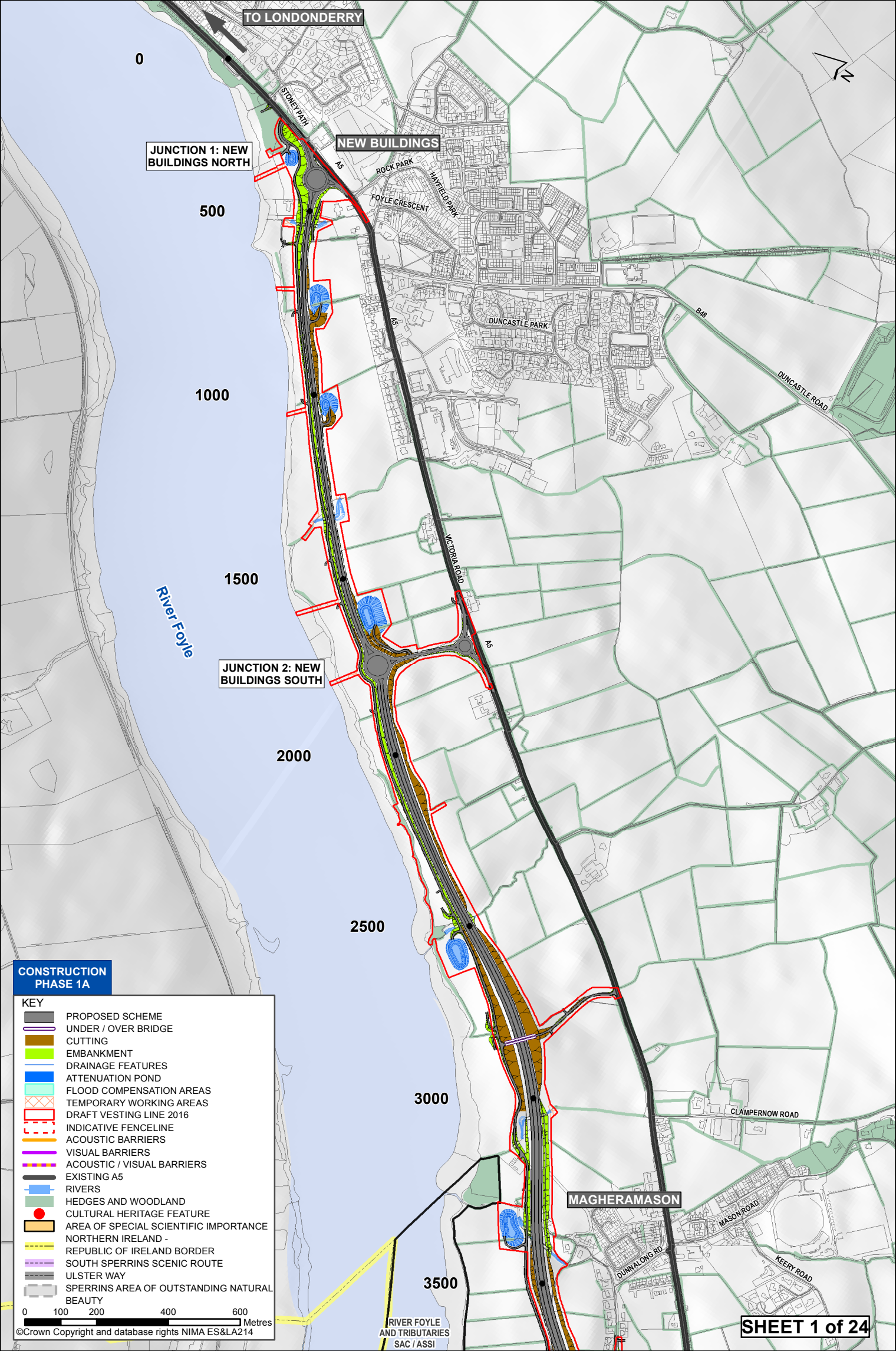
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NEW BUILDINGS
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1000
1500
JUNCTION 2: NEW BUILDINGS SOUTH
2000
2500
3000
3500
River Foyle
STONEY PATH
A5
ROCK PARK
FOYLE CRESCENT
HATFIELD PARK
DUNCASTLE PARK
B48
DUNCASTLE ROAD
VICTORIA ROAD
CLAMPERNOW ROAD
MAGHERAMASON
MASON ROAD
DUNNALONG RD
KEERY ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
CONSTRUCTION PHASE 1A
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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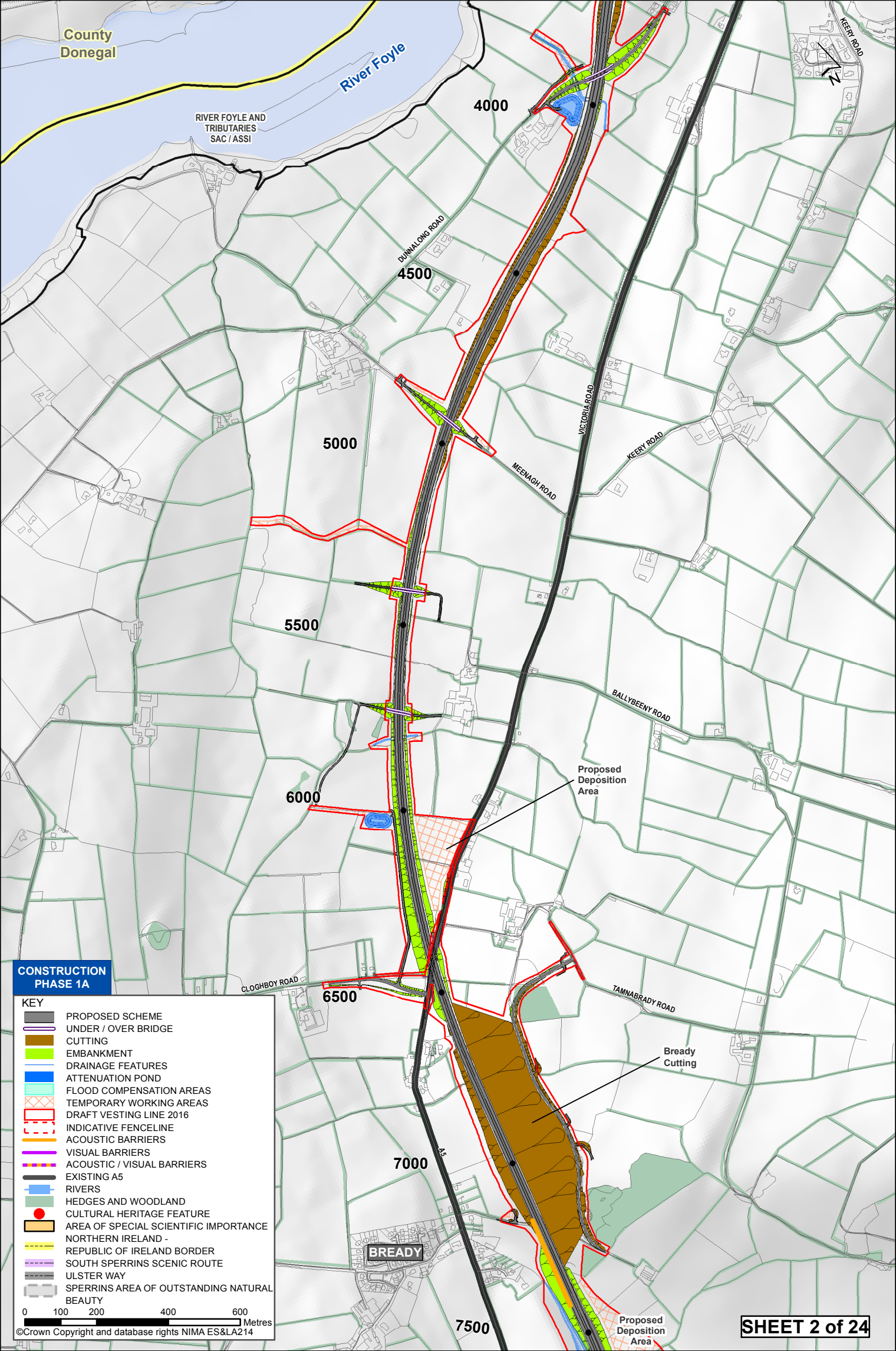
SHEET 1 of 24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VICTORIA ROAD
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MEENAGH ROAD
5500
BALLYBEENY ROAD
Proposed Deposition Area
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CLOGHBOY ROAD
6500
TAMNABRADY ROAD
Bready Cutting
A5
7000
BREADY
7500
Proposed Deposition Area
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UNDER / OVER BRIDGE
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EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
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CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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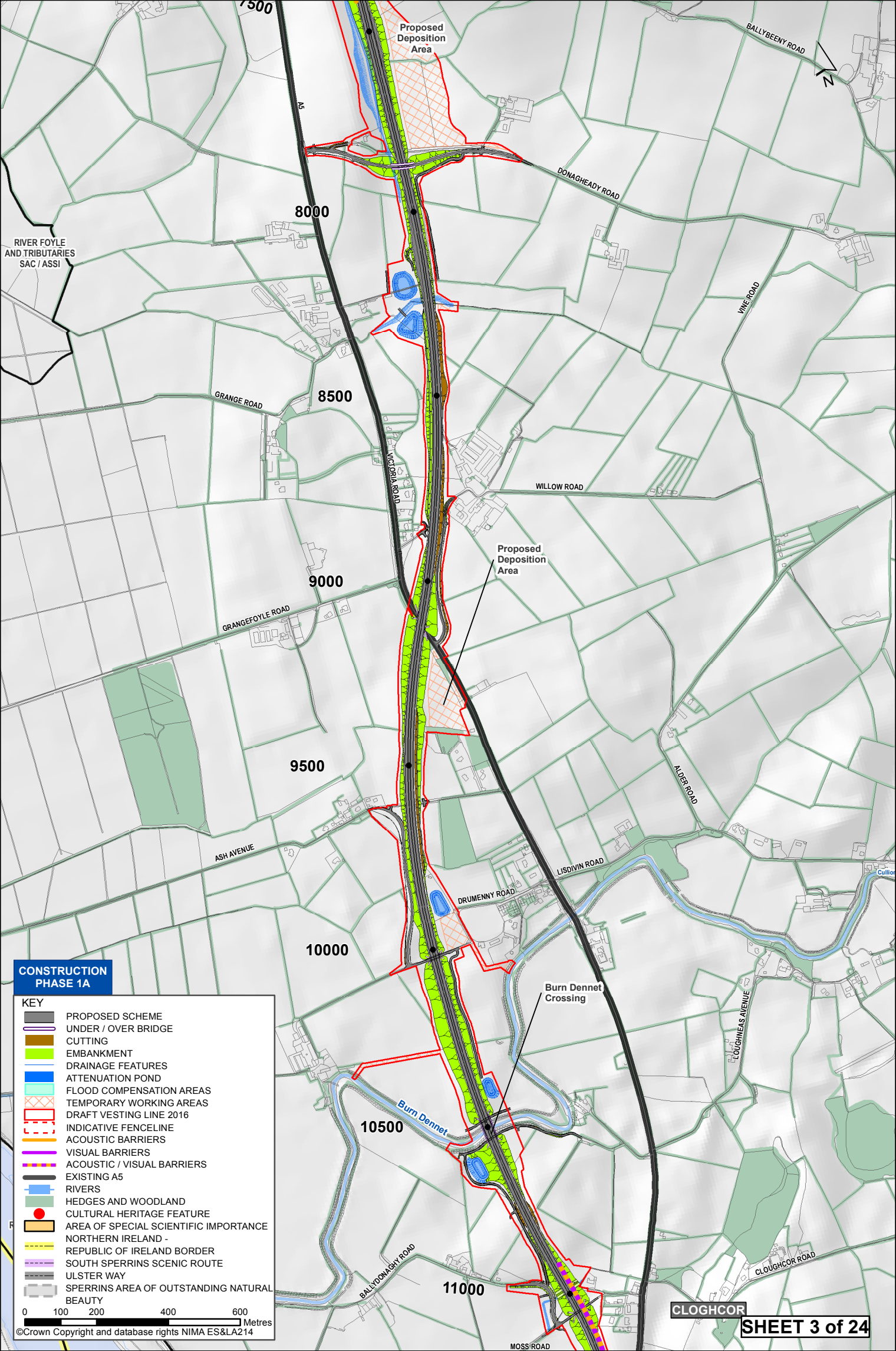
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Proposed Deposition Area
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DONAGHEADY ROAD
VINE ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
GRANGE ROAD
VICTORIA ROAD
WILLOW ROAD
GRANGEFOYLE ROAD
ALDER ROAD
ASH AVENUE
LISDIVIN ROAD
DRUMENNY ROAD
LOUGHNEAS AVENUE
Burn Dennet
BALLYDONAGHY ROAD
CLOUGHCOR ROAD
MOSS ROAD
CLOGHCOR
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SOUTH SPERRINS SCENIC ROUTE
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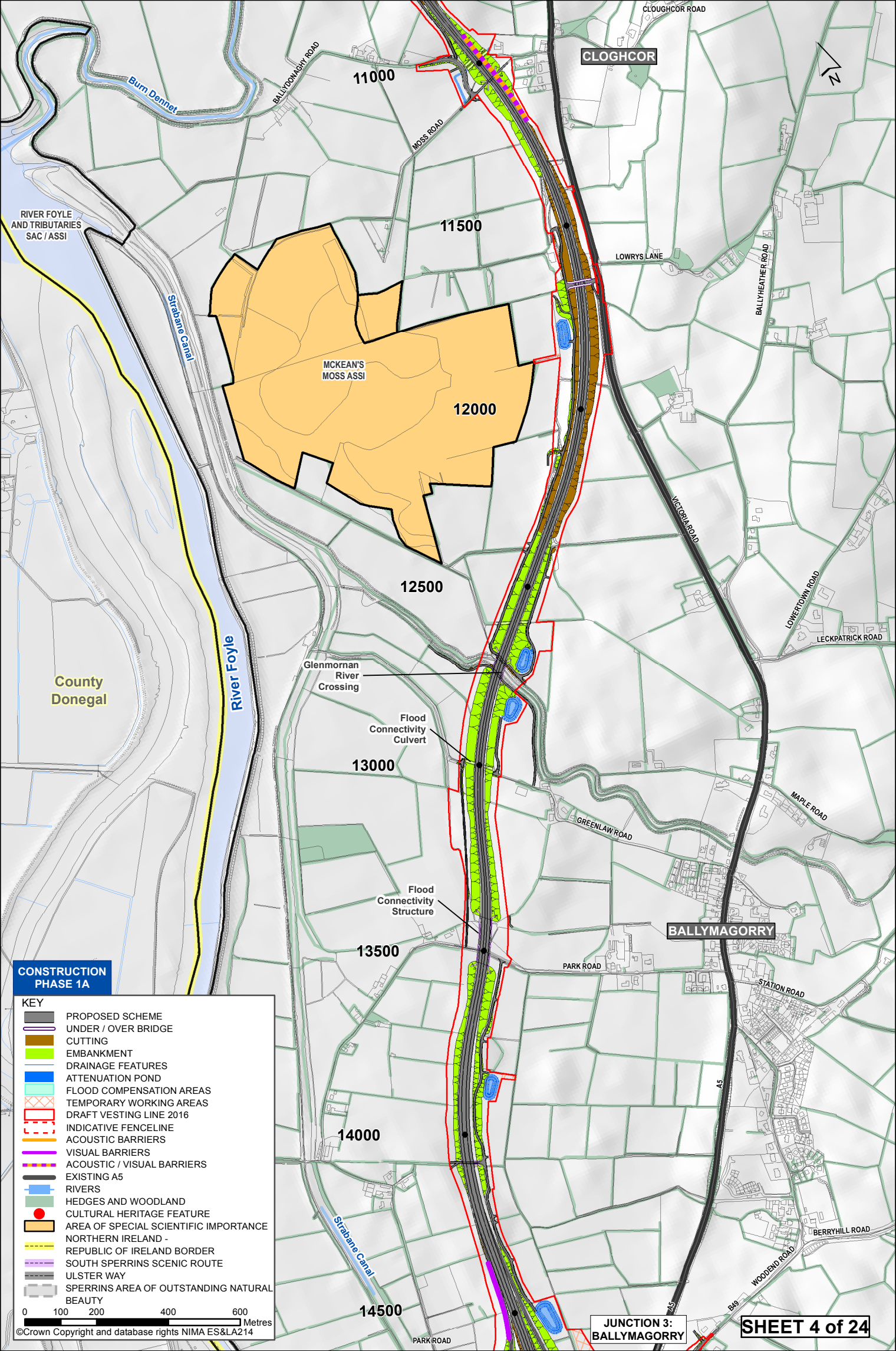
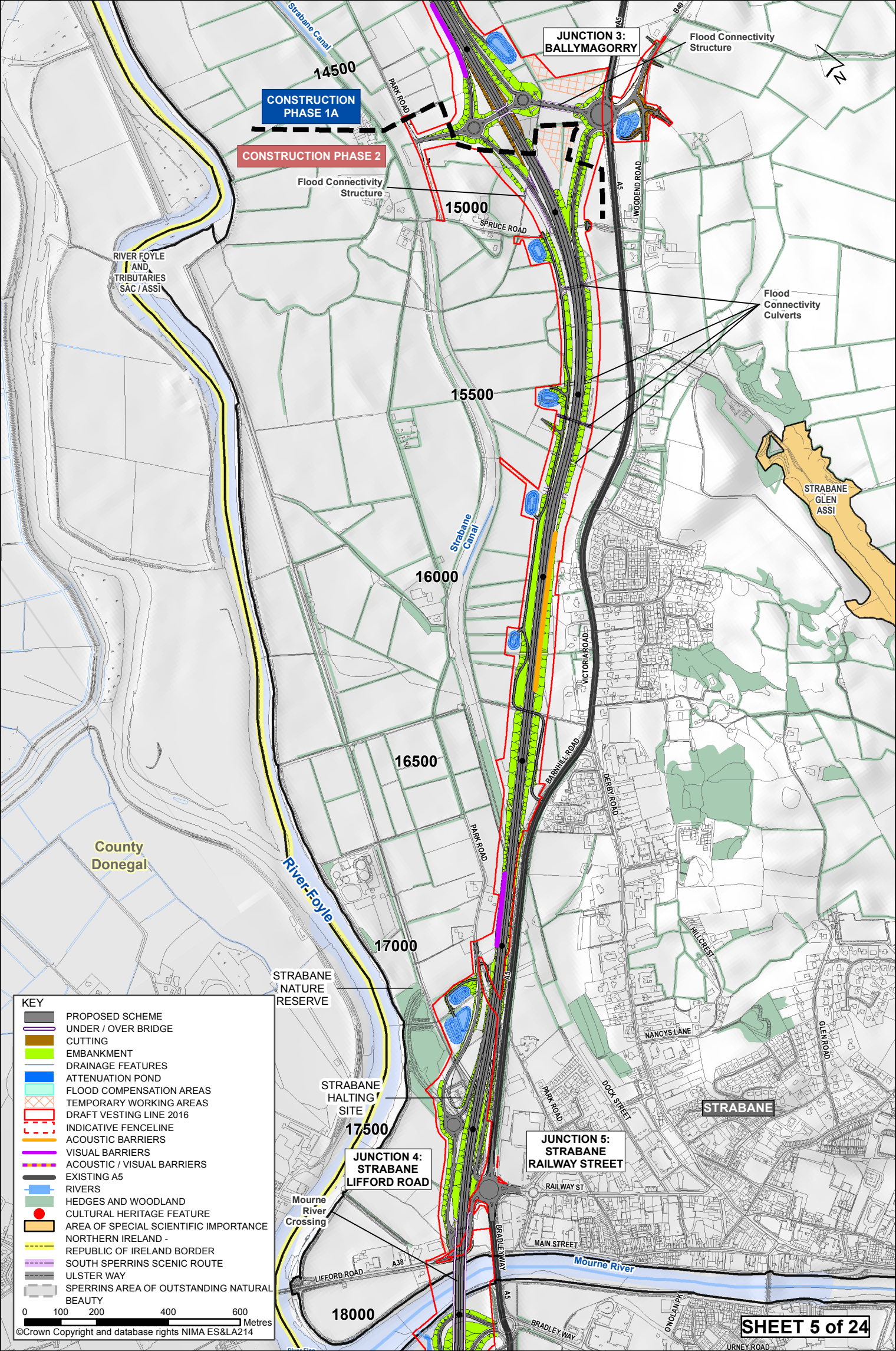
SHEET 3 of 24

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SPRUCE ROAD
WOODEND ROAD
A5
B49
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Flood Connectivity Culverts
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Strabane Canal
VICTORIA ROAD
BARNHILL ROAD
DERBY ROAD
PARK ROAD
County Donegal
River Foyle
HILLCREST
NANCYS LANE
GLEN ROAD
STRABANE NATURE RESERVE
STRABANE HALTING SITE
DOCK STREET
STRABANE
JUNCTION 5: STRABANE RAILWAY STREET
RAILWAY ST
JUNCTION 4: STRABANE LIFFORD ROAD
Mourne River Crossing
BRADLEY WAY
MAIN STREET
Mourne River
A38
LIFFORD ROAD
ONOLAMPK
URNEY ROAD
KEY
PROPOSED SCHEME
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EMBANKMENT
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SOUTH SPERRINS SCENIC ROUTE
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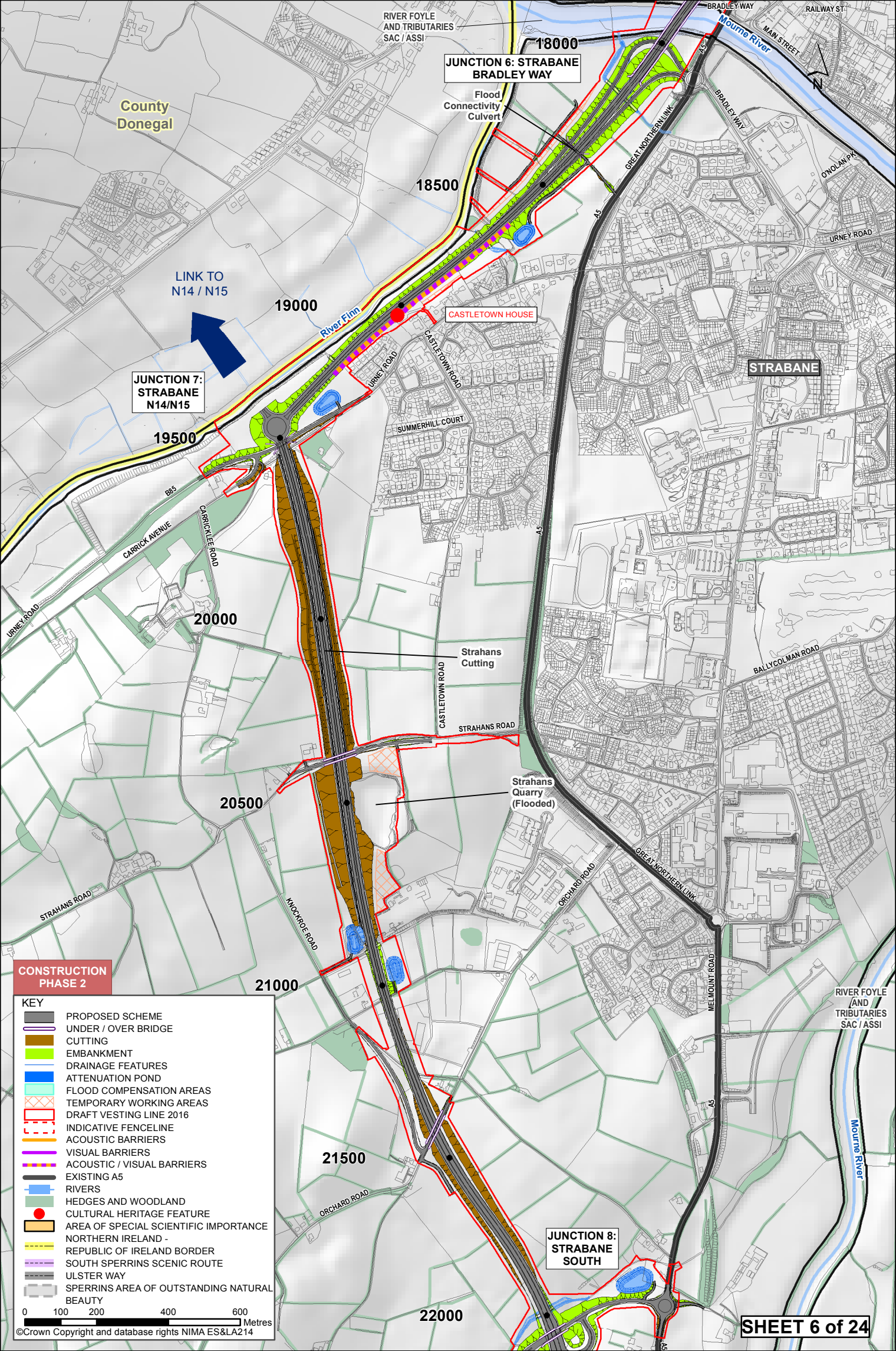
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MAIN STREET
N
County Donegal
18500
GREAT NORTHERN LINK
A5
O'NOLAN PK
URNEY ROAD
LINK TO N14 / N15
19000
River Finn
CASTLETOWN HOUSE
CASTLETOWN ROAD
STRABANE
JUNCTION 7: STRABANE N14/N15
19500
SUMMERHILL COURT
B85
CARRICK AVENUE
CARRICKLEE ROAD
20000
Strahans Cutting
BALLYCOLMAN ROAD
STRAHANS ROAD
20500
Strahans Quarry (Flooded)
ORCHARD ROAD
KNOCKROE ROAD
MELMOUNT ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
21000
21500
JUNCTION 8: STRABANE SOUTH
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CONSTRUCTION PHASE 2
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SOUTH SPERRINS SCENIC ROUTE
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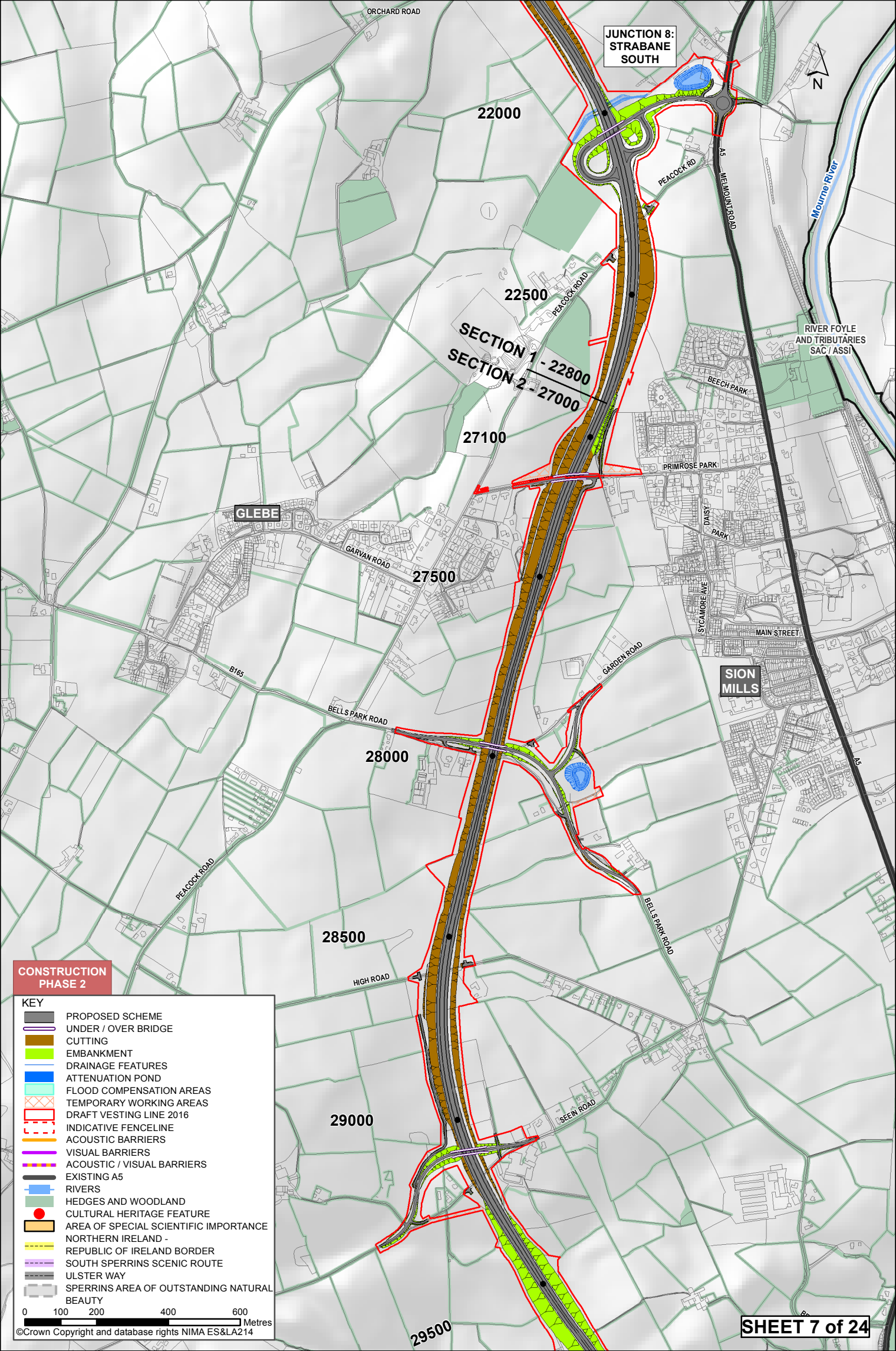
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RIVER FOYLE AND TRIBUTARIES SAC / ASSI
SECTION 1 - 22800
SECTION 2 - 27000
27100
BEECH PARK
PRIMROSE PARK
GLEBE
DAISY PARK
GARVAN ROAD
27500
SYCAMORE AVE
MAIN STREET
GARDEN ROAD
SION MILLS
B165
BELLS PARK ROAD
28000
A5
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BELLS PARK ROAD
HIGH ROAD
SEEIN ROAD
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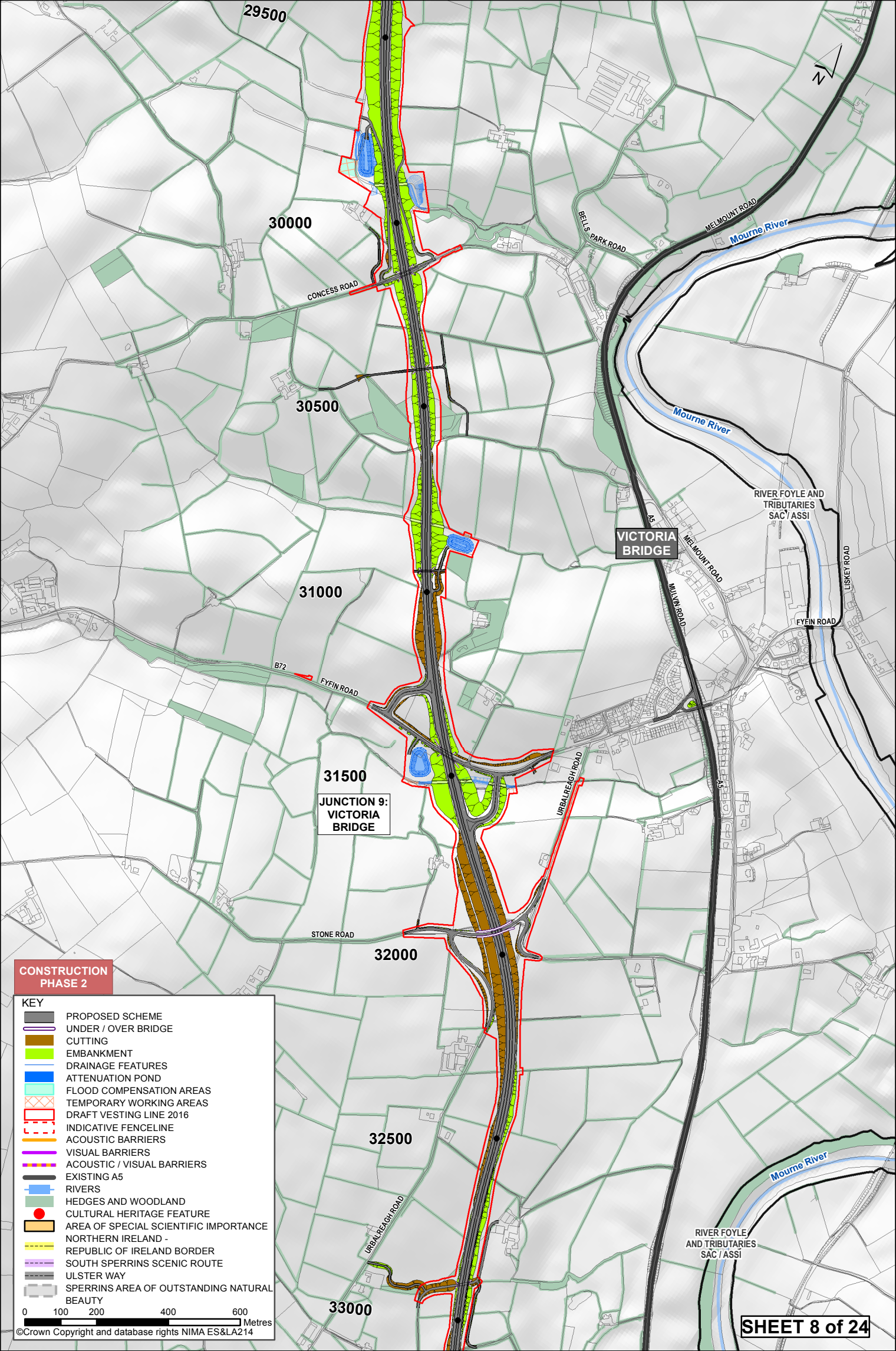
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VICTORIA BRIDGE
A5
MELMOUNT ROAD
MULVIN ROAD
LISKEY ROAD
FYFIN ROAD
B72
FYFIN ROAD
JUNCTION 9: VICTORIA BRIDGE
URBALREAGH ROAD
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STONE ROAD
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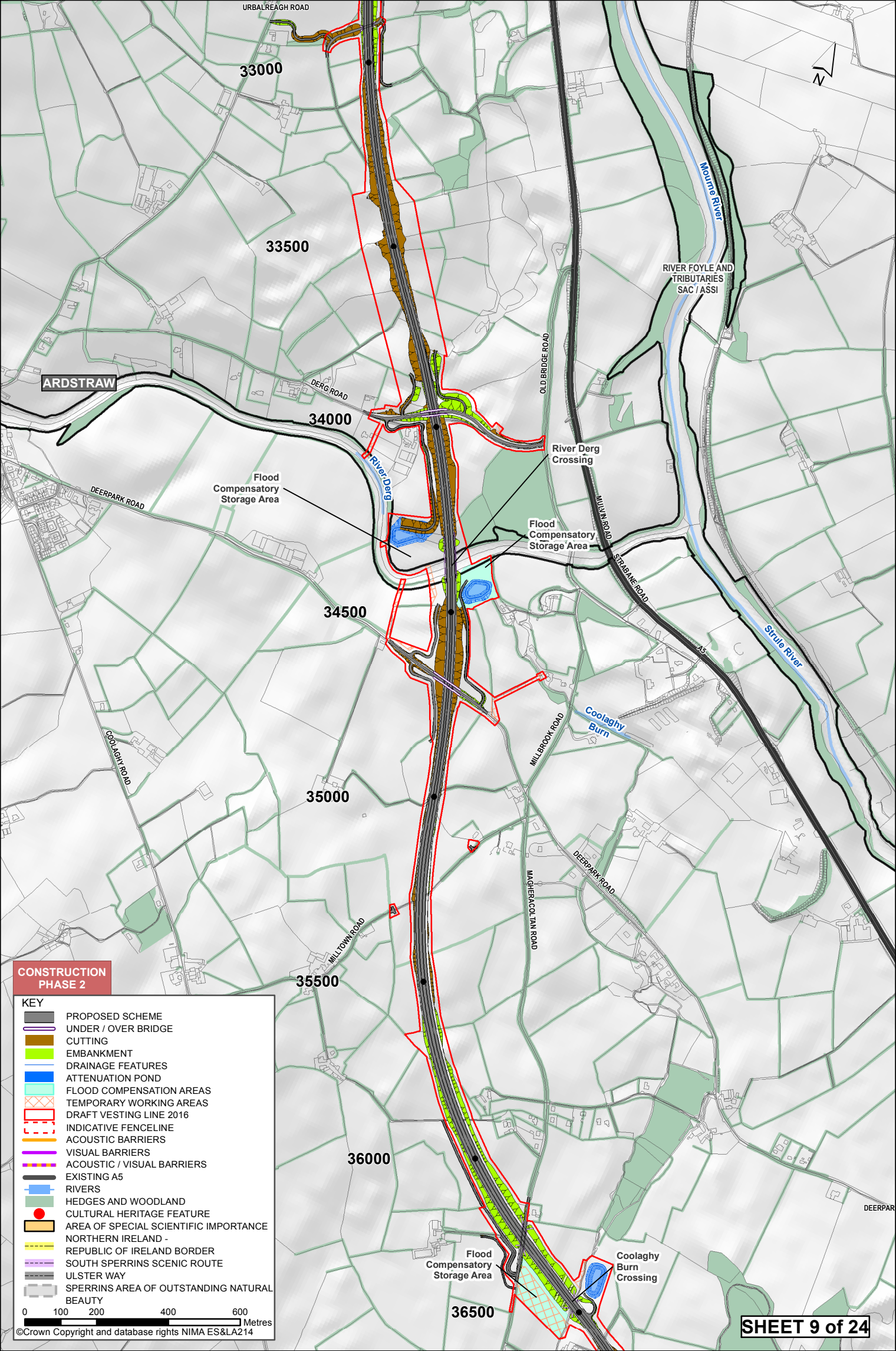
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ARDSTRAW
DERG ROAD
DEERPARK ROAD
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MILLTOWN ROAD
MILLBROOK ROAD
MAGHERACOLTAN ROAD
OLD BRIDGE ROAD
MILLVIN ROAD
STRABANE ROAD
A5
River Derg
River Derg Crossing
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
Coolaghy Burn
Coolaghy Burn Crossing
DEERPAR
N
CONSTRUCTION PHASE 2
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PROPOSED SCHEME
UNDER / OVER BRIDGE
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DRAINAGE FEATURES
ATTENUATION POND
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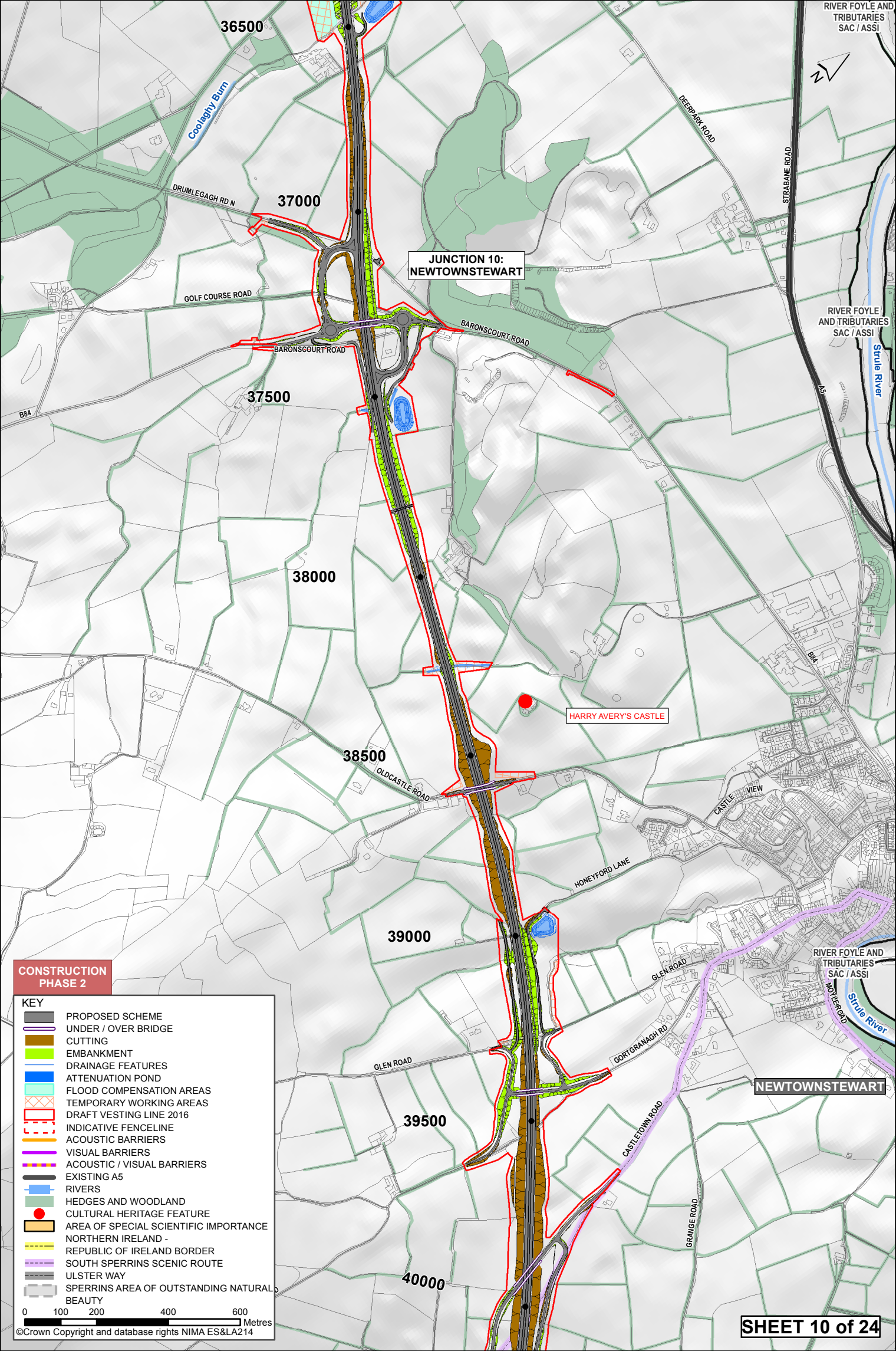
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GOLF COURSE ROAD
BARONSCOURT ROAD
BARONSCOURT ROAD
B84
DEERPARK ROAD
STRABANE ROAD
A5
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
B84
HARRY AVERY'S CASTLE
OLDCASTLE ROAD
CASTLE VIEW
HONEYFORD LANE
GLEN ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
MOTHERROAD
Strule River
GORTGRANAGH RD
GLEN ROAD
NEWTOWNSTEWART
CASTLETOWN ROAD
GRANGE ROAD
CONSTRUCTION PHASE 2
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SOUTH SPERRINS SCENIC ROUTE
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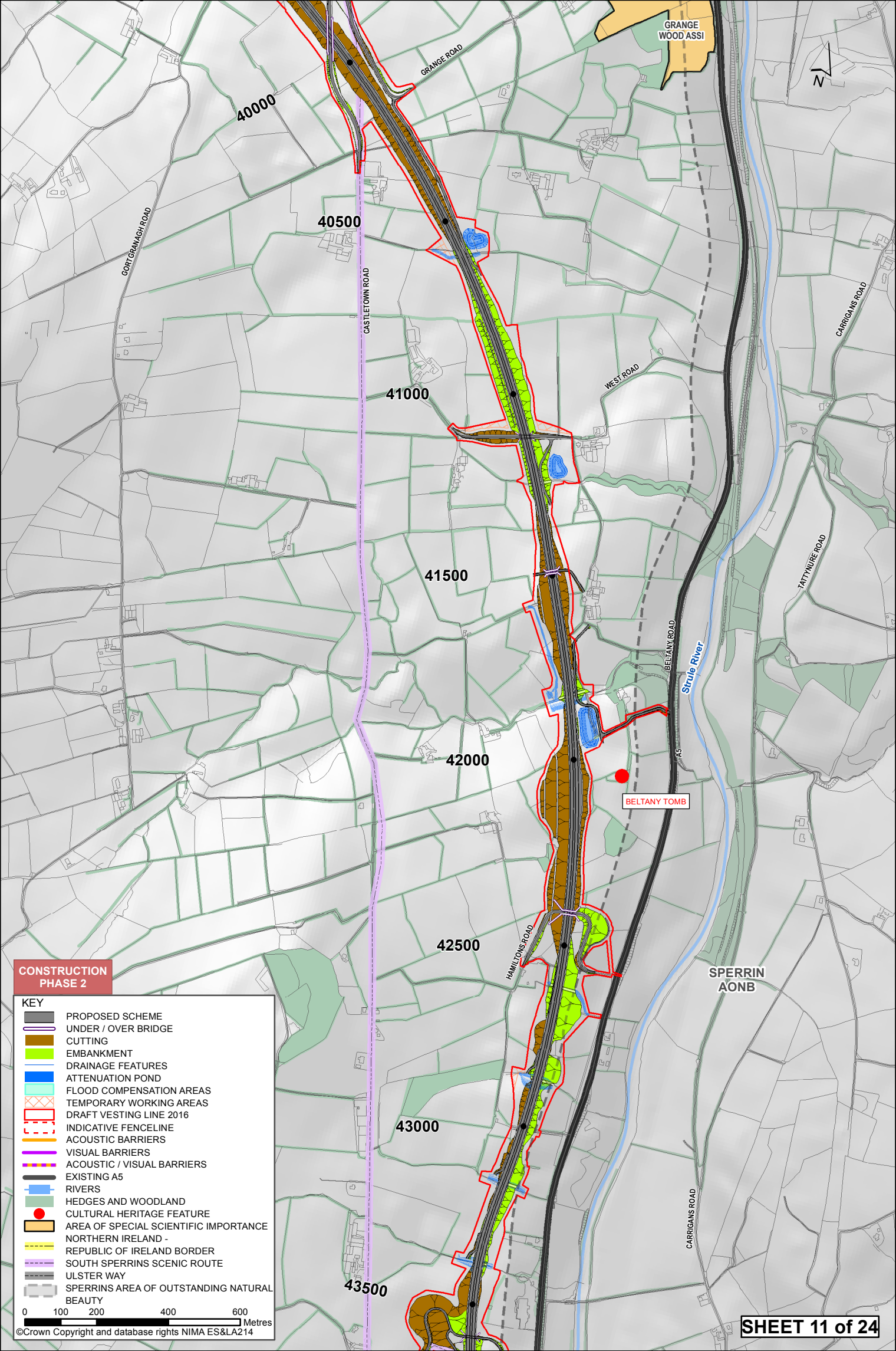

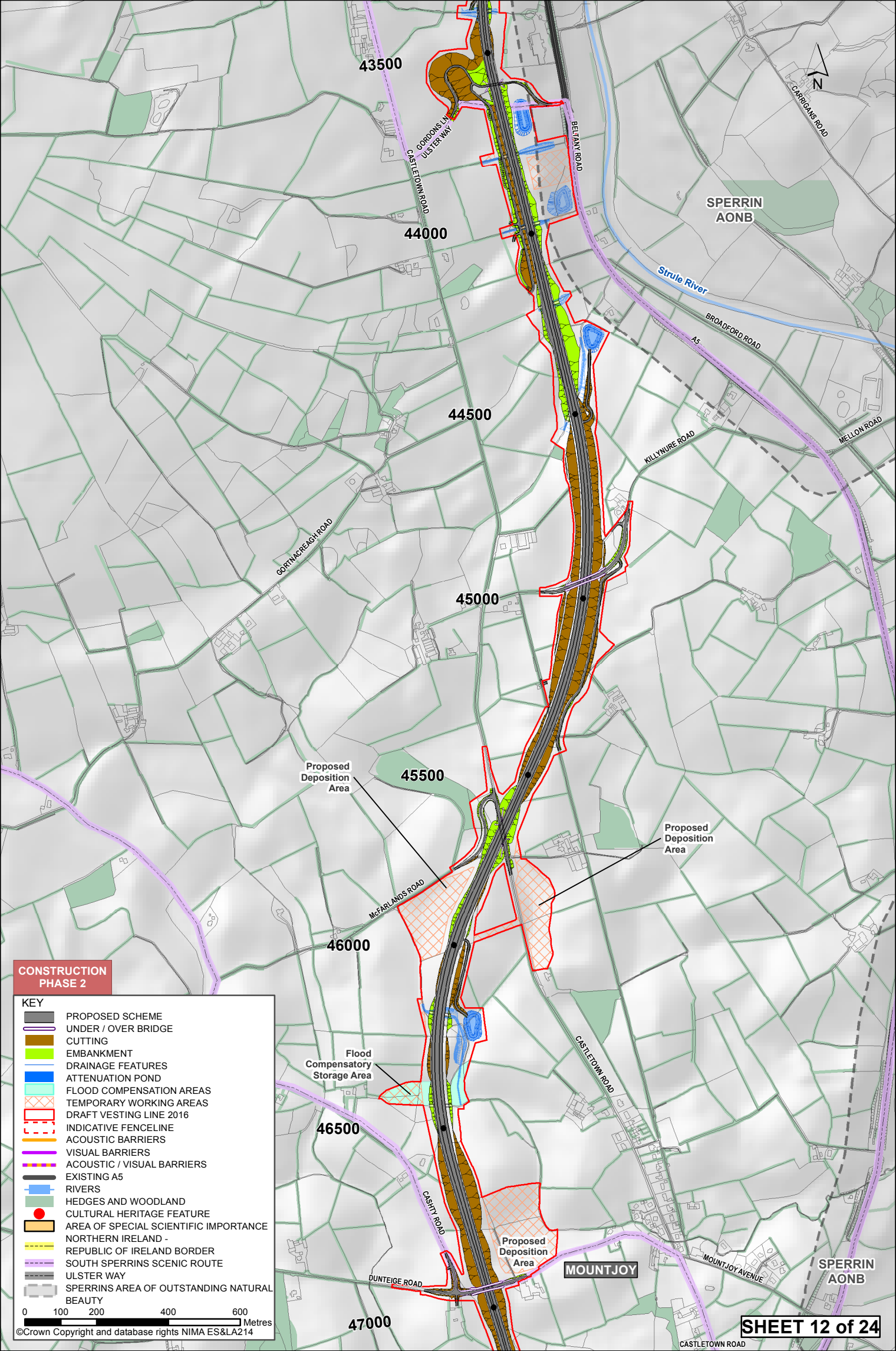
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SPERRIN AONB
Strule River
BROADFORD ROAD
A5
MELLON ROAD
KILLYNURE ROAD
GORTNACREAGH ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
McFARLANDS ROAD
Flood Compensatory Storage Area
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CASHTY ROAD
DUNTEIGE ROAD
MOUNTJOY
MOUNTJOY AVENUE
SPERRIN AONB
CASTLETOWN ROAD
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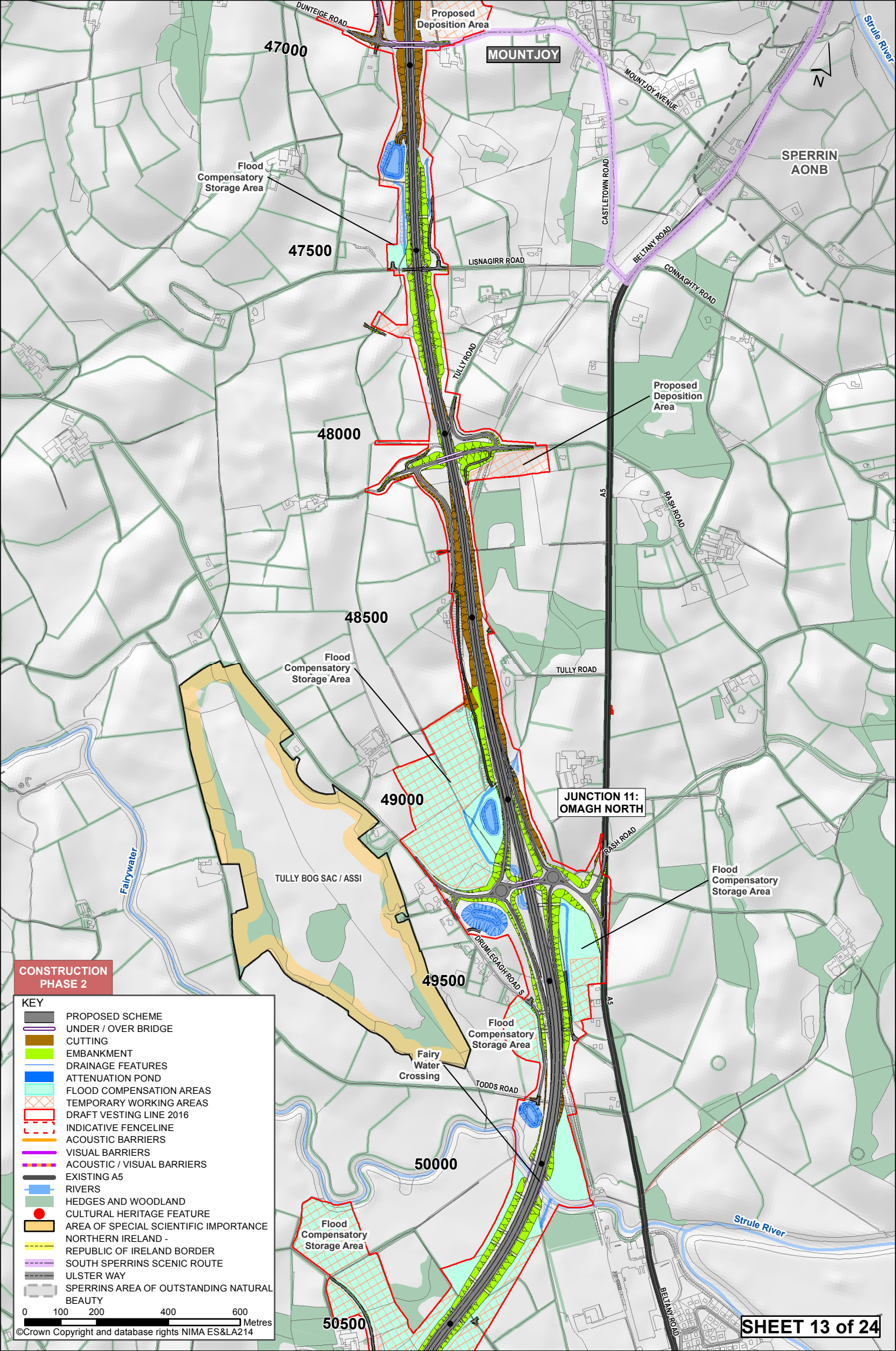
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BELTANY ROAD
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LISNAGIRR ROAD
CONNAGHTY ROAD
TULLY ROAD
Proposed Deposition Area
48000
A5
RASH ROAD
48500
Flood Compensatory Storage Area
TULLY ROAD
JUNCTION 11: OMAGH NORTH
49000
RASH ROAD
Fairywater
TULLY BOG SAC / ASSI
Flood Compensatory Storage Area
DRUMLEGAGH ROAD S
A5
49500
Flood Compensatory Storage Area
Fairy Water Crossing
TODDS ROAD
50000
Flood Compensatory Storage Area
Strule River
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UNDER / OVER BRIDGE
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SOUTH SPERRINS SCENIC ROUTE
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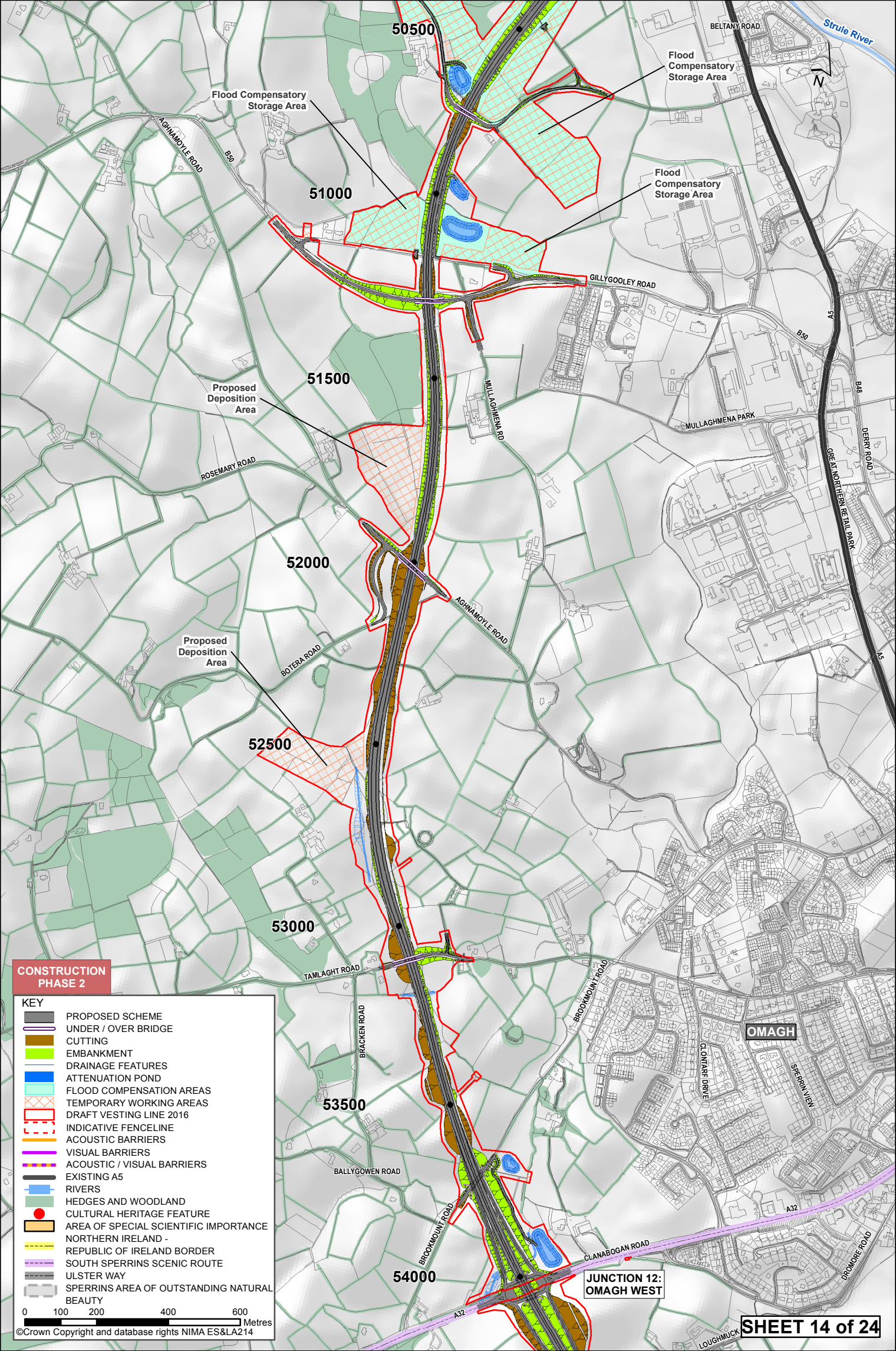

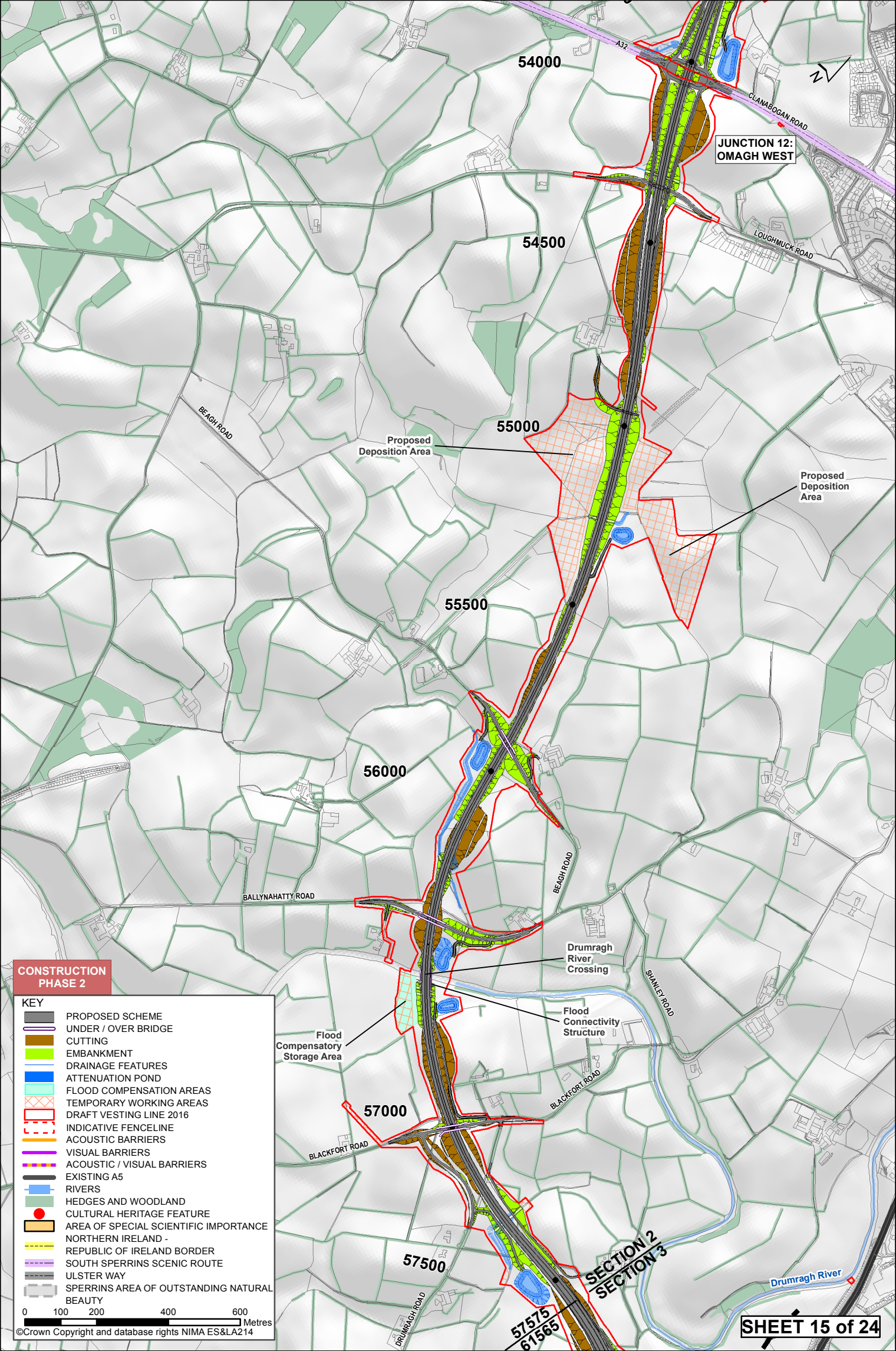
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Proposed
Deposition
Area
BALLYNAHATTY ROAD
BEAGH ROAD
Drumragh
River
Crossing
SHANLEY ROAD
Flood
Connectivity
Structure
Flood
Compensatory
Storage Area
BLACKFORT ROAD
BLACKFORT ROAD
DRUMRAGH ROAD
SECTION 2
SECTION 3
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57575
61565
CONSTRUCTION
PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL
BEAUTY
0 100 200 400 600
Metres
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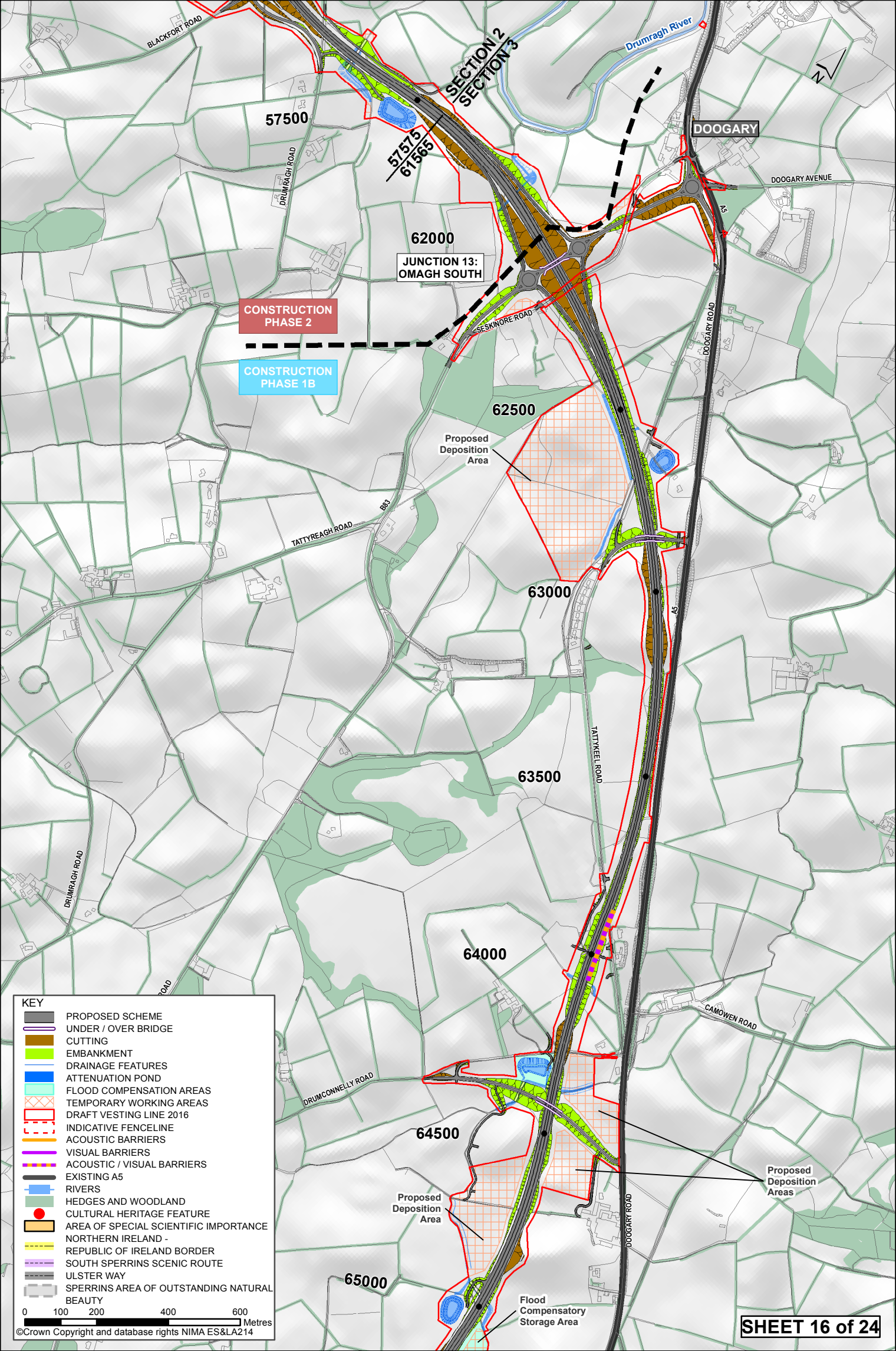
BLACKFORT ROAD
SECTION 2
SECTION 3
Drumragh River
57500
DRUMRAGH ROAD
57575
61565
DOOGARY
DOOGARY AVENUE
A5
62000
JUNCTION 13:
OMAGH SOUTH
CONSTRUCTION
PHASE 2
CONSTRUCTION
PHASE 1B
SESKINORE ROAD
DOOGARY ROAD
62500
Proposed
Deposition
Area
B83
TATTYREAGH ROAD
63000
A5
TATTYKEEL ROAD
63500
DRUMRAGH ROAD
64000
CAMOWEN ROAD
DRUMCONNELLY ROAD
64500
Proposed
Deposition
Areas
Proposed
Deposition
Area
DOOGARY ROAD
65000
Flood
Compensatory
Storage Area
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL
BEAUTY
0 100 200 400 600
Metres
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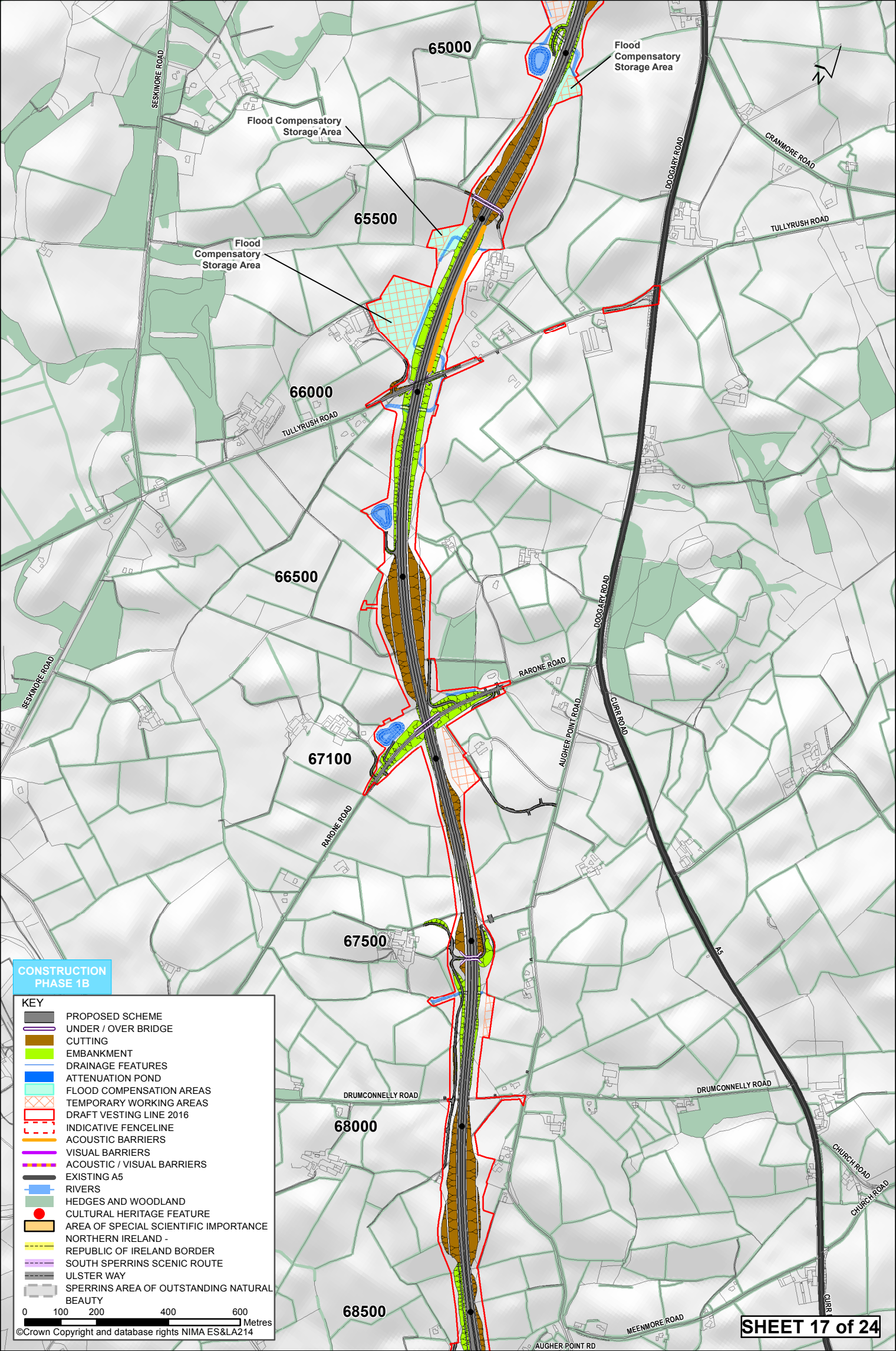
65000
65500
66000
66500
67100
67500
68000
68500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
SESKINORE ROAD
SESKINORE ROAD
DOOGARY ROAD
DOOGARY ROAD
CRANMORE ROAD
TULLYRUSH ROAD
TULLYRUSH ROAD
RARONE ROAD
RARONE ROAD
AUGHER POINT ROAD
CURR ROAD
A5
DRUMCONNELLY ROAD
DRUMCONNELLY ROAD
CHURCH ROAD
CHURCH ROAD
MEENMORE ROAD
AUGHER POINT RD
N
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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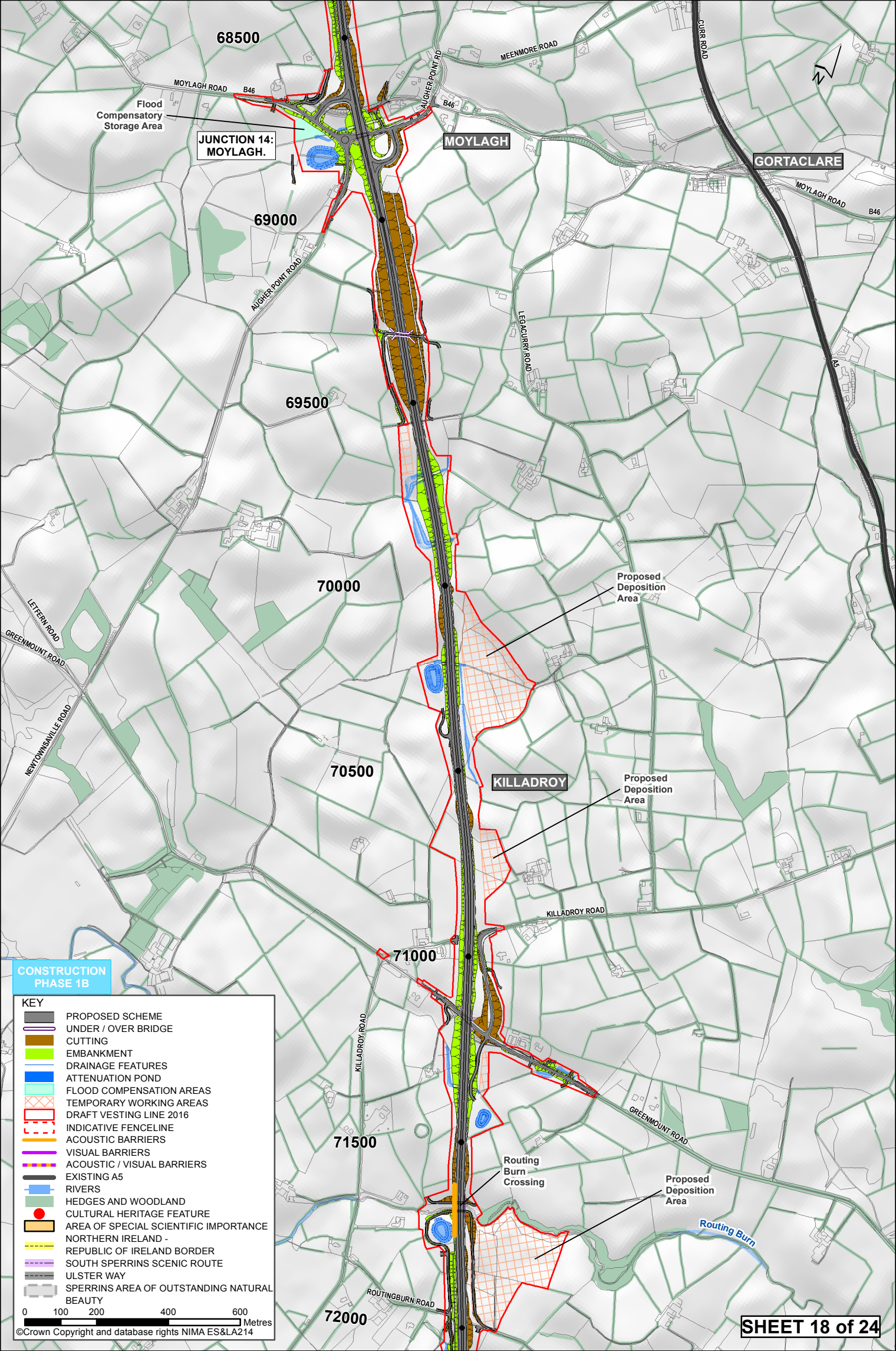
68500
MOYLAGH ROAD
B46
Flood Compensatory Storage Area
JUNCTION 14: MOYLAGH.
AUGHER POINT RD
MEENMORE ROAD
CURR ROAD
MOYLAGH
GORTACLARE
MOYLAGH ROAD
B46
69000
AUGHER POINT ROAD
LEGACURRY ROAD
A5
69500
70000
Proposed Deposition Area
LETTERN ROAD
GREENMOUNT ROAD
NEWTOWNSAVILLE ROAD
70500
KILLADROY
Proposed Deposition Area
KILLADROY ROAD
71000
KILLADROY ROAD
GREENMOUNT ROAD
71500
Routing Burn Crossing
Proposed Deposition Area
Routing Burn
ROUTINGBURN ROAD
72000
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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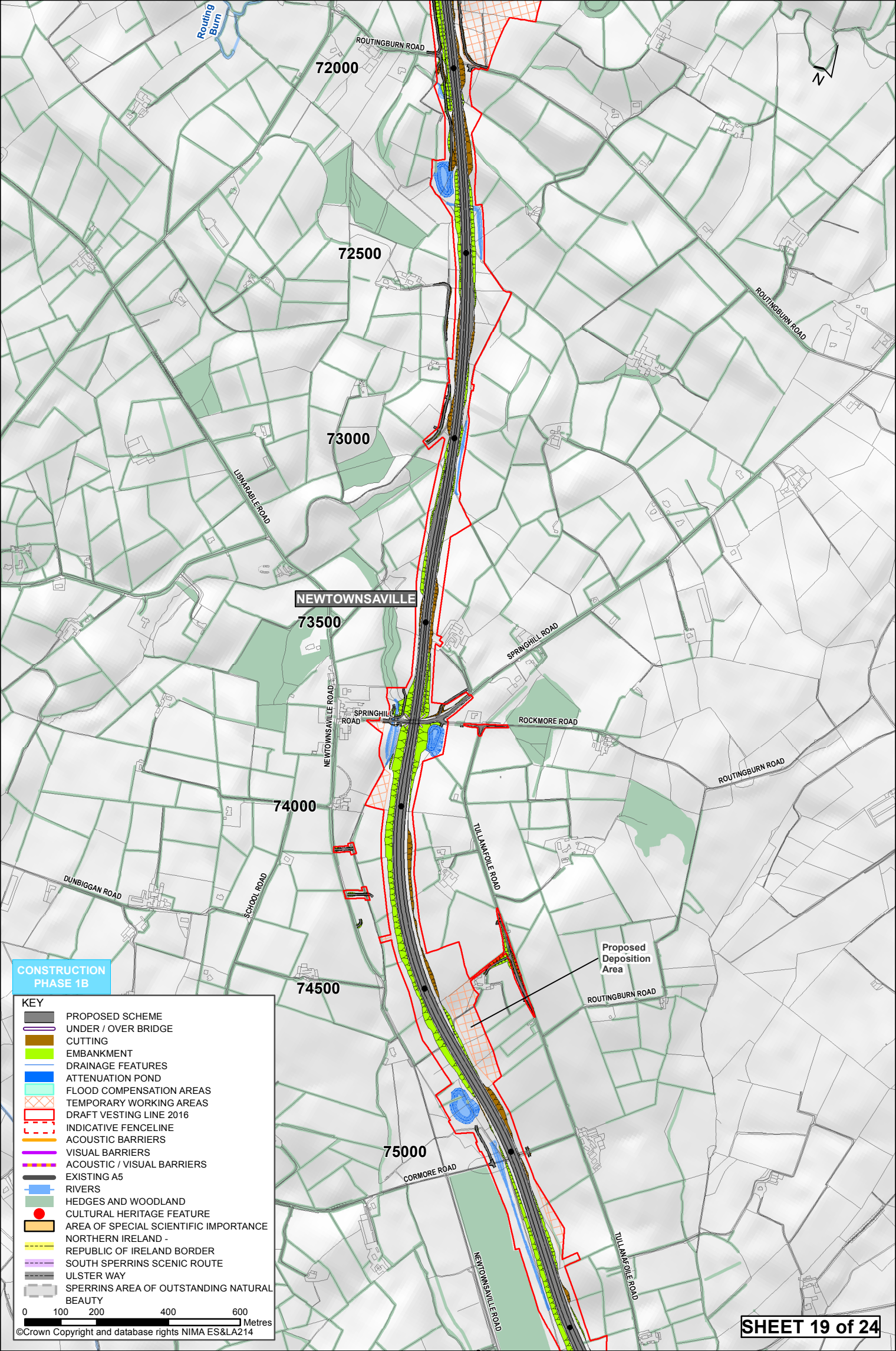
Routing Burn
ROUTINGBURN ROAD
72000
72500
73000
73500
74000
74500
75000
N
LISNARABLE ROAD
NEWTOWNSAVILLE
SPRINGHILL ROAD
NEWTOWNSAVILLE ROAD
SPRINGHILL ROAD
ROCKMORE ROAD
ROUTINGBURN ROAD
TULLANAFOILE ROAD
DUNBIGGAN ROAD
SCHOOL ROAD
Proposed Deposition Area
ROUTINGBURN ROAD
CORMORE ROAD
NEWTOWNSAVILLE ROAD
TULLANAFOILE ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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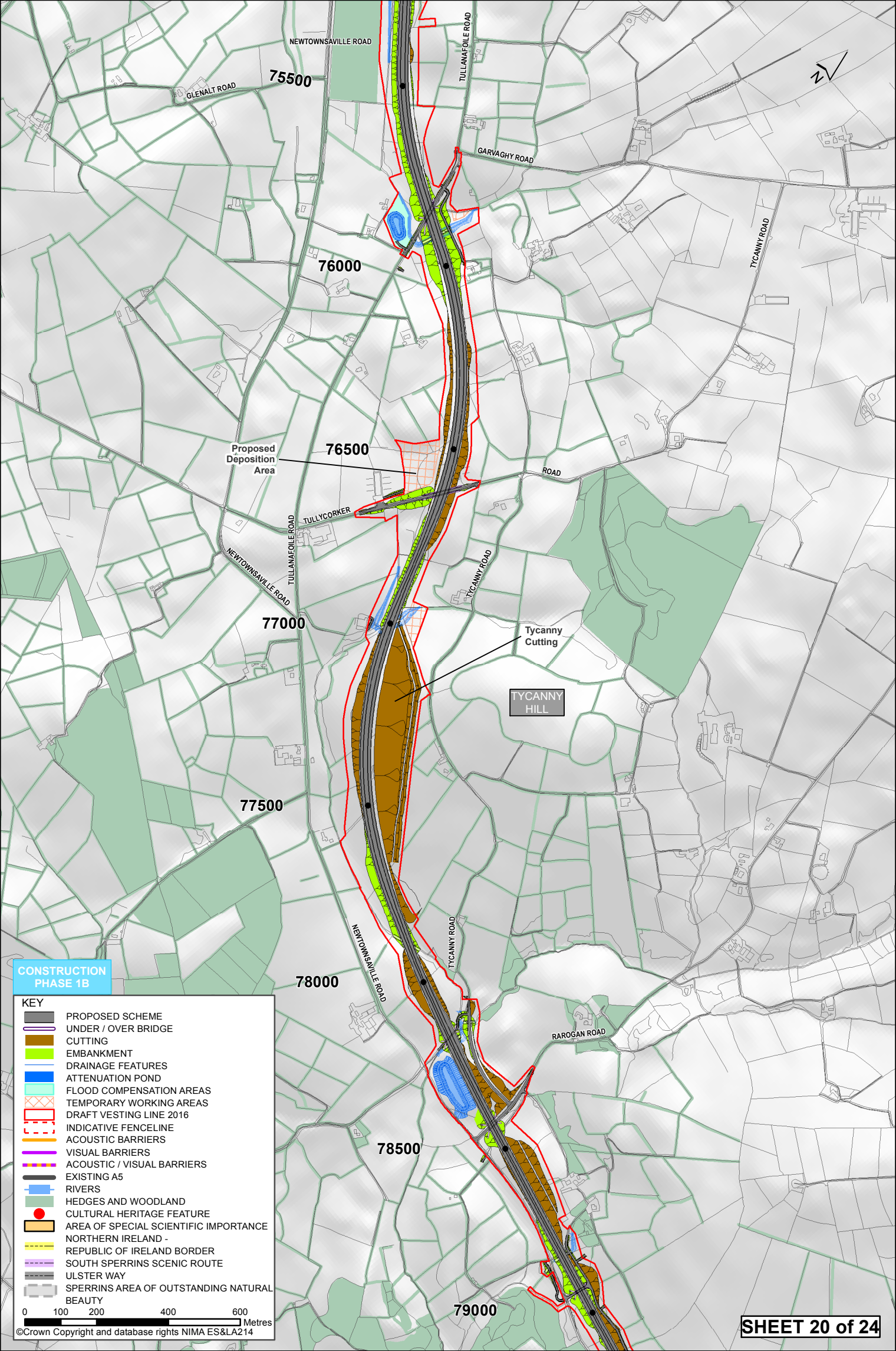
NEWTOWNSAVILLE ROAD
GLENALT ROAD
75500
TULLANAFOILE ROAD
GARVAGHY ROAD
TYCANNY ROAD
76000
Proposed Deposition Area
76500
ROAD
TULLYCORKER
TULLANAFOILE ROAD
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
77000
Tycanny Cutting
TYCANNY HILL
77500
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
78000
RAROGAN ROAD
78500
79000
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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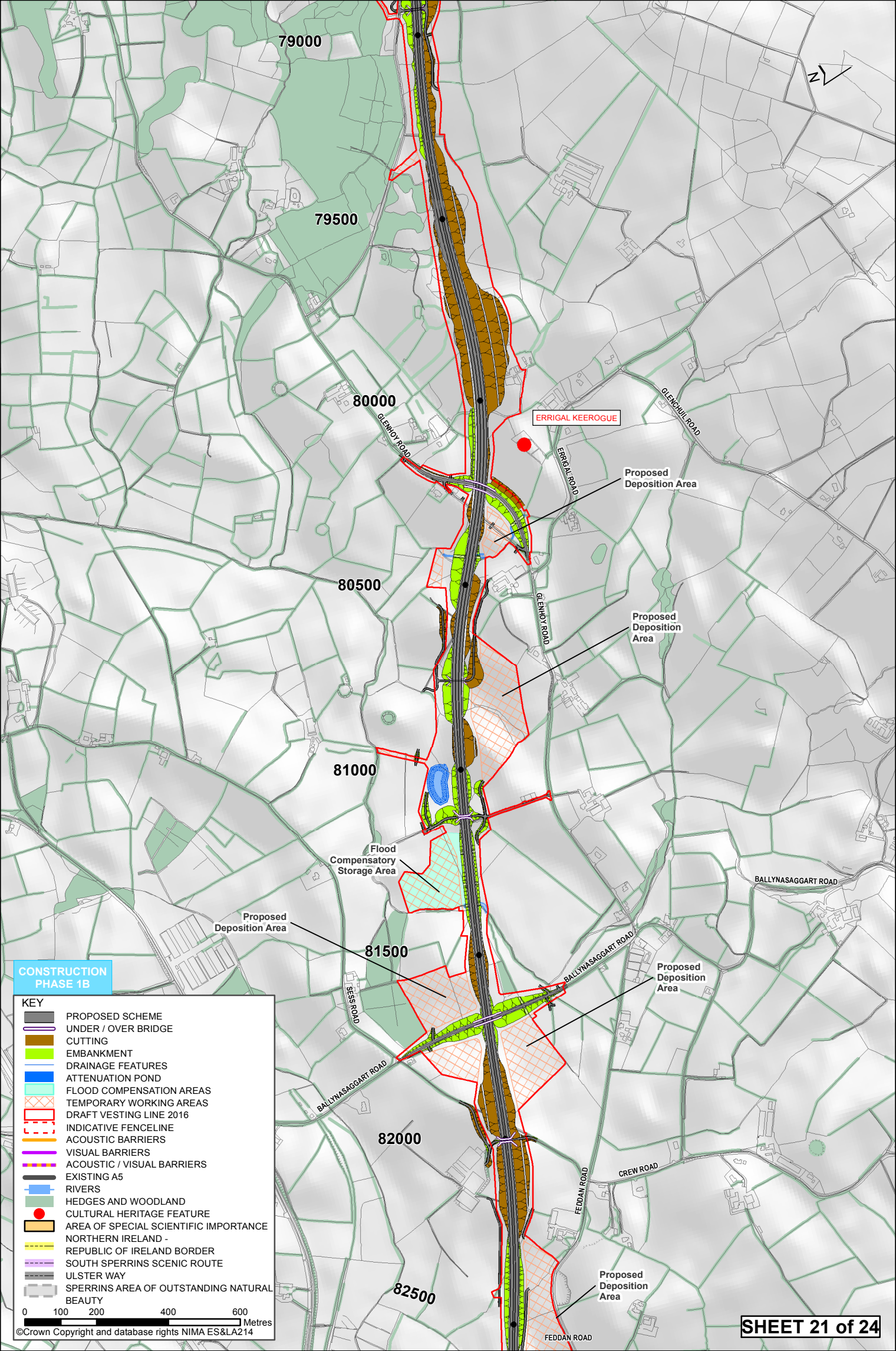
SHEET 20 of 24


79000
79500
80000
80500
81000
81500
82000
82500
N
ERRIGAL KEEROGUE
GLENHOY ROAD
ERRIGAL ROAD
GLENCHUIL ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Flood Compensatory Storage Area
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
SESS ROAD
CREW ROAD
FEDDAN ROAD
FEDDAN ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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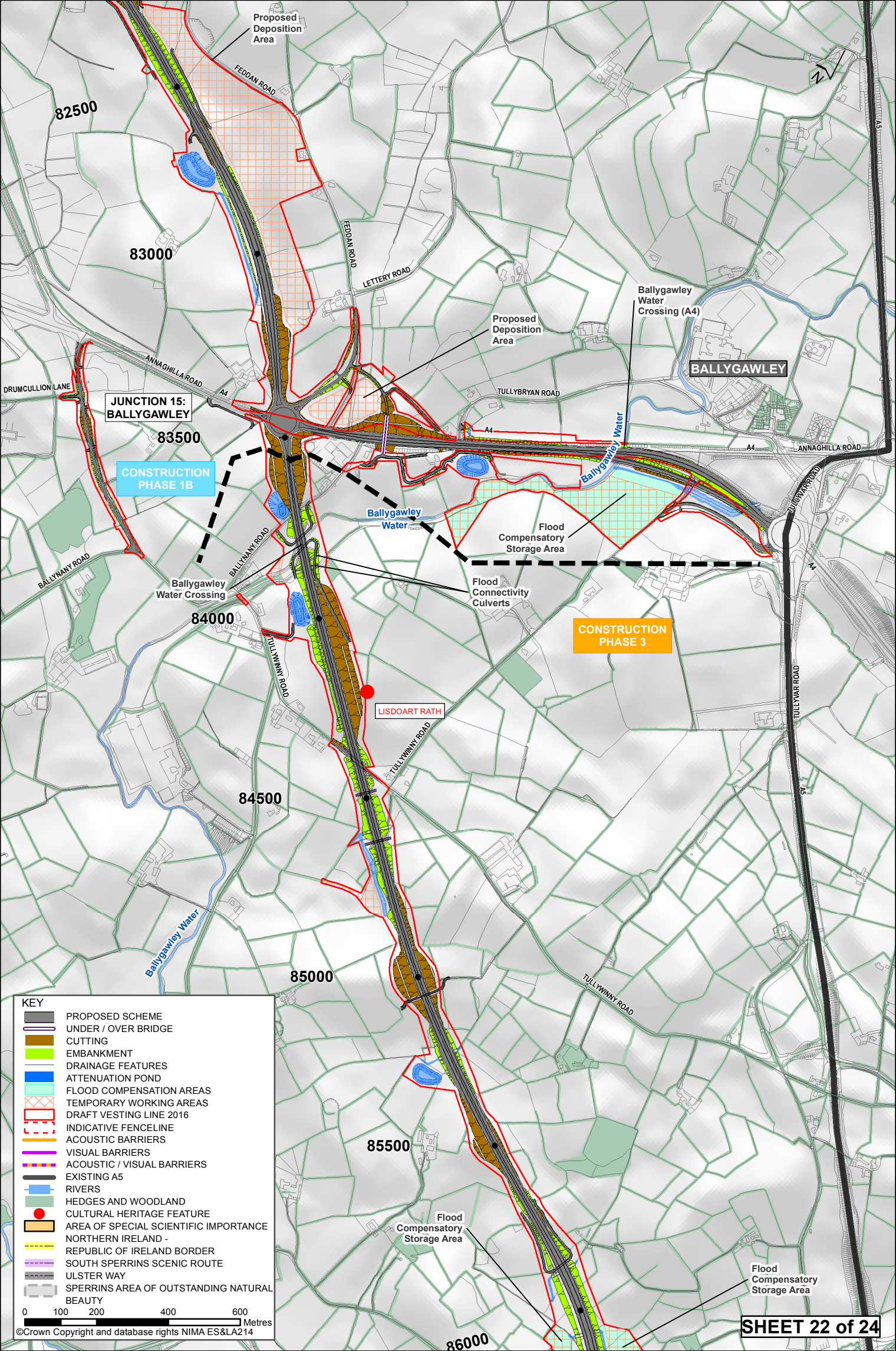
SHEET 21 of 24


Proposed Deposition Area
FEDDAN ROAD
82500
83000
LETTERY ROAD
Ballygawley Water Crossing (A4)
Proposed Deposition Area
BALLYGAWLEY
ANNAGHILLA ROAD
A4
DRUMCULLION LANE
JUNCTION 15: BALLYGAWLEY
TULLYBRYAN ROAD
83500
CONSTRUCTION PHASE 1B
Ballygawley Water
ANNAGHILLA ROAD
TULLYVAR ROAD
Flood Compensatory Storage Area
BALLYNANY ROAD
Ballygawley Water Crossing
Flood Connectivity Culverts
84000
CONSTRUCTION PHASE 3
TULLYWINNY ROAD
LISDOART RATH
84500
A5
85000
85500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
86000
N
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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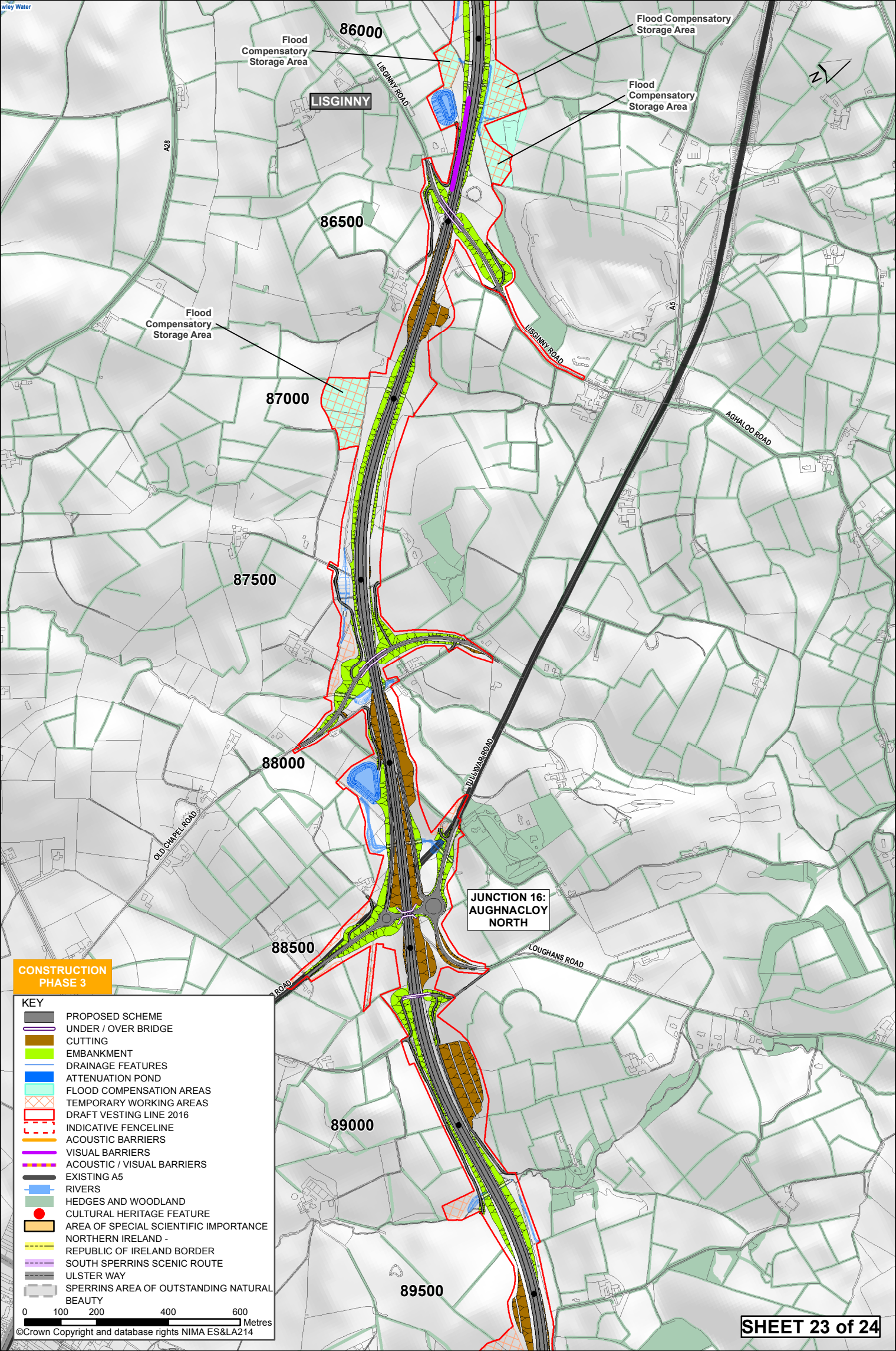
SHEET 22 of 24


Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
86000
86500
87000
87500
88000
88500
89000
89500
LISGINNY
LISGINNY ROAD
LISGINNY ROAD
A28
A5
AGHALOO ROAD
TULLYVAR ROAD
OLD CHAPEL ROAD
LOUGHANS ROAD
JUNCTION 16: AUGHNACLOY NORTH
N
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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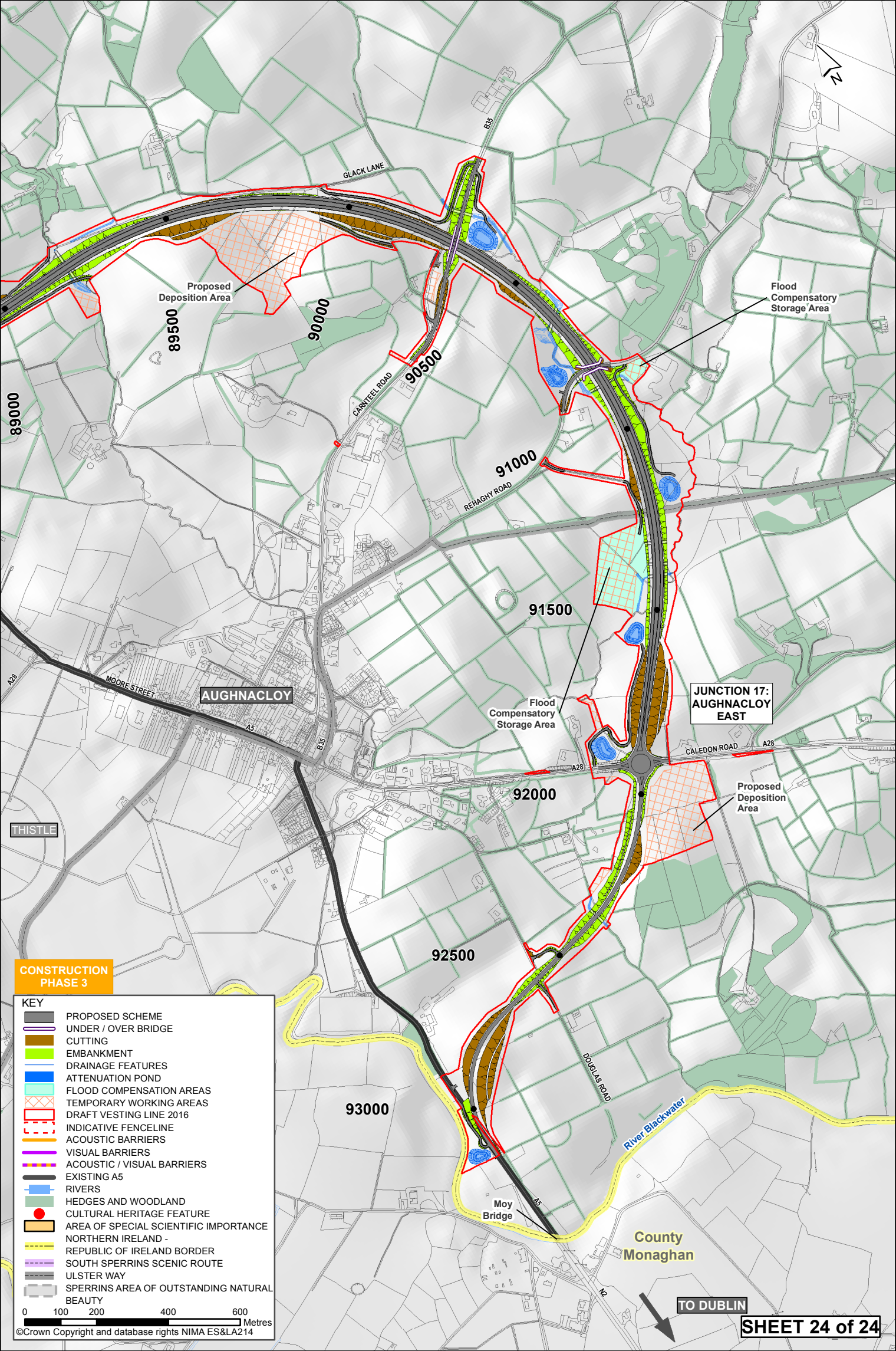
SHEET 23 of 24


N
GLACK LANE
B35
Proposed Deposition Area
89500
90000
90500
89000
CARNTEEL ROAD
Flood Compensatory Storage Area
91000
REHAGHY ROAD
91500
A28
MOORE STREET
AUGHNACLOY
A5
B35
Flood Compensatory Storage Area
JUNCTION 17: AUGHNACLOY EAST
CALEDON ROAD
A28
A28
92000
Proposed Deposition Area
THISTLE
92500
DOUGLAS ROAD
River Blackwater
93000
Moy Bridge
A5
County Monaghan
N2
TO DUBLIN
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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SHEET 24 of 24

Appendix 1: Figures 1 to 7

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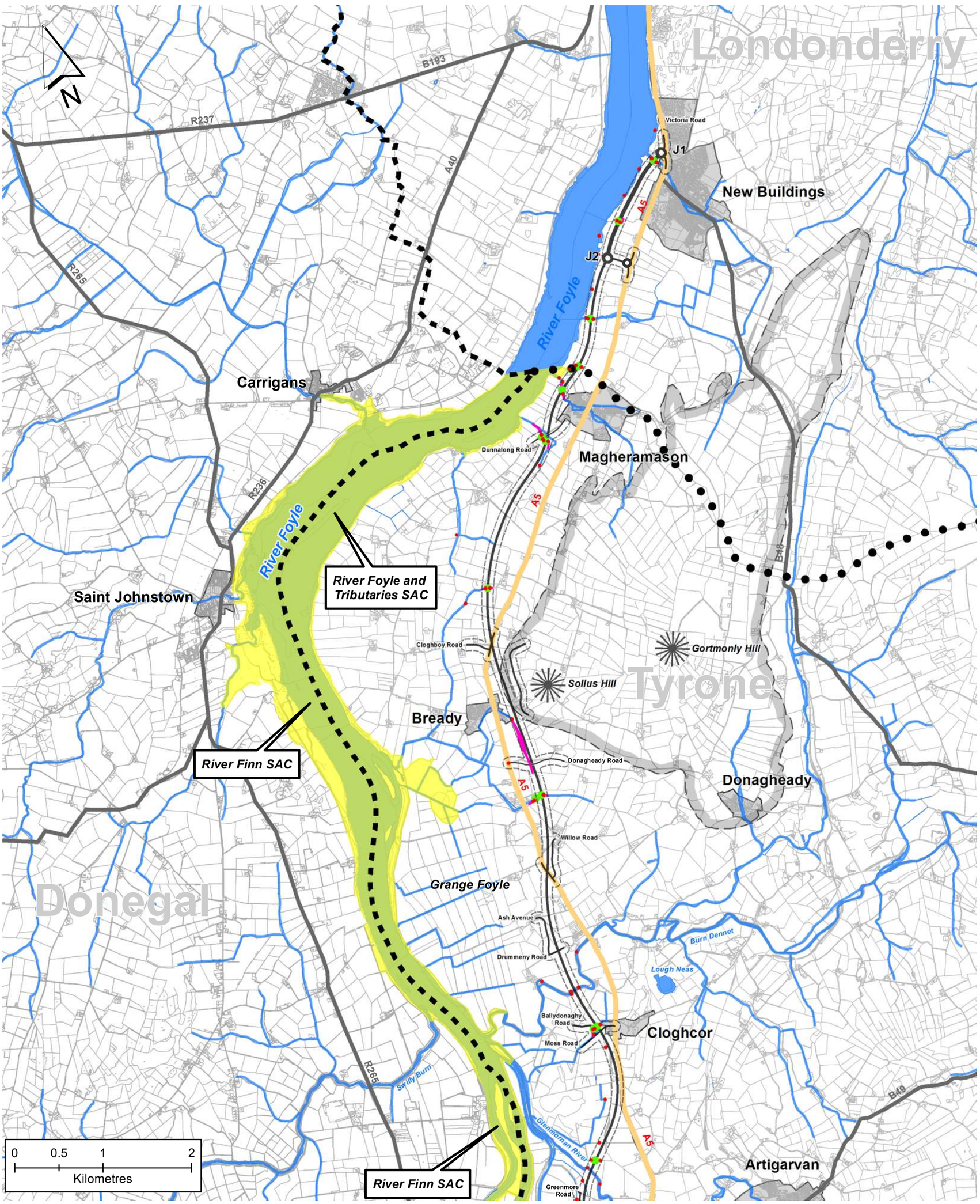


Figure No: Figure 1

Version: A

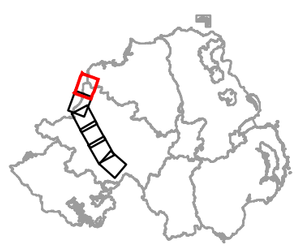
Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

mouchel building great relationships

Project: A5 WTC

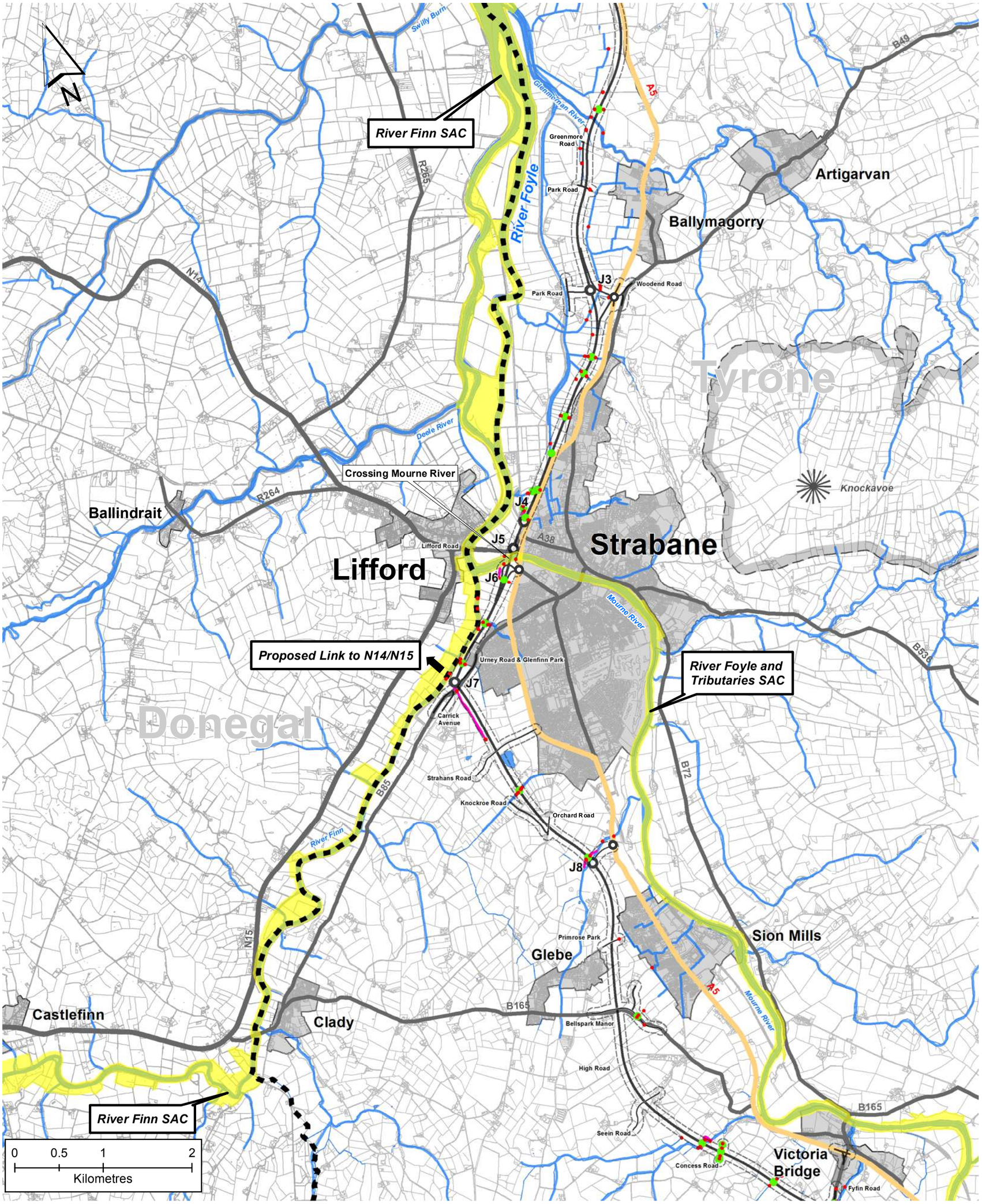
Client: ROADS Service

N



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



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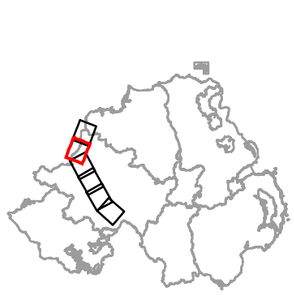
Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

Project: A5 WTC

Client: ROADS Service



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion

Glebe
Primrose Park
B165
Sion Mills
B536
Bellspark Manor
High Road
A5
Seein Road
Concess Road
Victoria Bridge
B165
A5
Fyfin Road
J9
B72
Stone Road
Urbalreagh Road
Douglas Bridge
Mourne River
B164
Derg Road
River Derg
Ardstraw
River Foyle and Tributaries SAC
Crossing River Derg
Deerpark Road
A5
Tyrone
B164
B165
Magheracoltan Road
Wood Hills
J10
Drumlegagh Road North
Baronscourt Road
Newtownstewart
B46
B47
Owenkillew River
Owenkillew River SAC
Strule River
Oldcastle Road
Glen Road
Gortgranagh Road
Grange Road
Castletown Road
B84
West Road
A5
Bessy Bell
0 0.5 1 2
Kilometres

Client: ROADS Service

Project: A5 WTC

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Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

Figure No: Figure 3

Version: A

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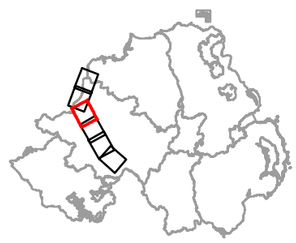

Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion

Baronscourt
B84
Bessy Bell
Gortgranagh Road
Castletown Road
Grange Road
West Road
A5
Strule River
McCormacks Road
Deers Leap
Tyrone
Killinure Road
Castletown Road
Mountjoy
Dunmullan
Dunteige Road
Lisnagirr Road
Tully Road
Rash Road
Knockmoyle
Drumlegagh Road South
J11
Fairy Water
B50
Gillygooly
Todds Road
Mellon Park Drive
Gortnagarn
Gillygooly Road
Botera Road
Aghnamoyle Road
B48
Tamlaght Road
Omagh
Brookmount Road
J12
A32
Camowen River
Drumragh River
A505
0 0.5 1 2
Kilometres

N

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Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion

Client: ROADS Service

Project: A5 WTC

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Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

Figure No: Figure 4

Version: A

Botera Road
Aghnamoyle Road
Tamlaght Road
Brookmount Road
J12
A32
Loughmuck Road
Clanabogan
Omagh
A5
B48
Camowen River
A505
B4
Drumragh River
Beagh Road
Ballynahatty Road
Drumragh River
Blackfort Road
Drumragh Road
J13
Seskinore Road
Tattykeel Road
A5
Edenderry
Camowen River
Tyrone
Drumconnelly Road
B122
B158
Tattyreagh
B83
Tullyrush Road
Rarone Road
Drumconnelly Road
Seskinore
B46
Beragh
Moylagh
Moylagh Road
J14
B46
Fintona
Augher Point Road
Routing Burn
0 0.5 1 2
Kilometres

Client: ROADS Service

Project: A5WTC

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Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

Figure No: Figure 5

Version: A

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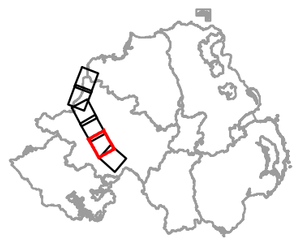

Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion

J14
Moylagh
Moylagh Road
Augher Point Road
B46
Routing Burn
Killadroy Road
Greenmount Road
Routingburn Road
A5
Eskragh
Newtownsaville
B168
Springhill Road
Rockmore Road
Garvaghy Big Hill
Tullanafoile Hill
Newtownsaville Road
Tullanafoile Road (The Rocks)
Cormore Road
Garvaghy
Beltany Hill
Tullanafoile Road
Tyrone
Tullycorker Road
B83
Knockmany
Tycanny Hill
Tycanny Road
Rarogan Road
Newtownsaville Road
A5
Clogher
A4
B83
Augher
Glenhoy Road
Ballynasaggart Road
A4 Annaghilla Road
A28
0 0.5 1 2
Kilometres

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Drawing Title: INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

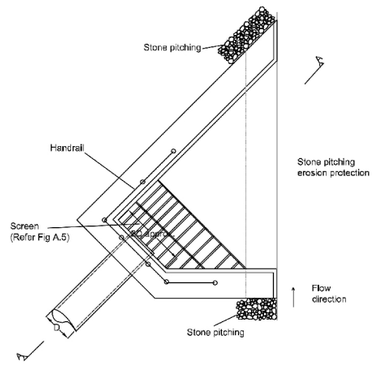
Figure No: Figure 6

Version: A

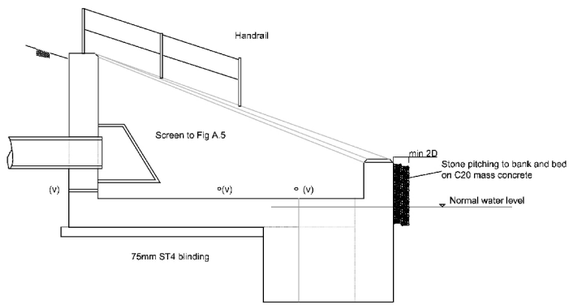
N

Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Special Area of Conservation (SAC)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



Plan

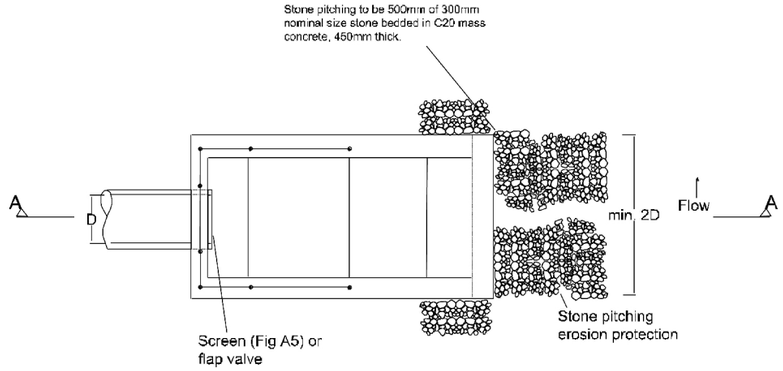


Notes:-

(i) Structure should not project into channel
(ii) Wall slope to correspond with bank profile but not steeper than 1:1
(iii) Handrail Ref. Clause 10.5
(iv) Screen Ref. Chapter 8 and Fig A.5
(v) Weep holes through wall if necessary
(vi) Screen may be replaced by a flap valve

Section 'A-A'

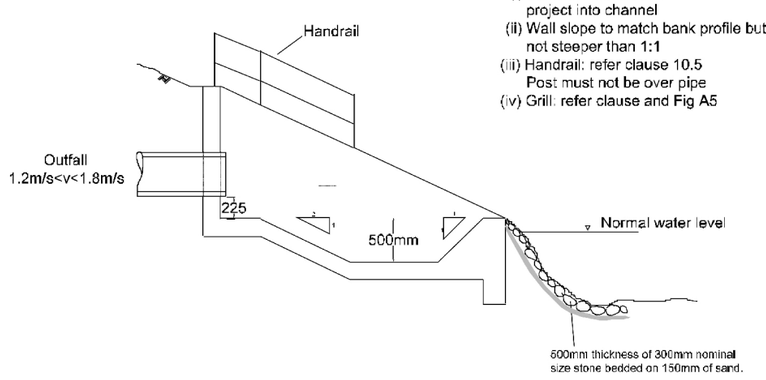
Figure A1: Typical Outfall Headwall



Plan

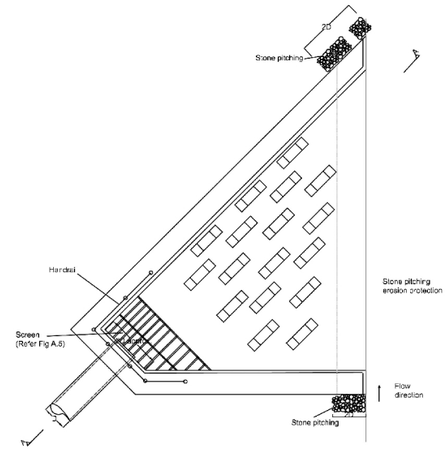
Notes:

(i) Structure should not project into channel
(ii) Wall slope to match bank profile but not steeper than 1:1
(iii) Handrail: refer clause 10.5 Post must not be over pipe
(iv) Grill: refer clause and Fig A5

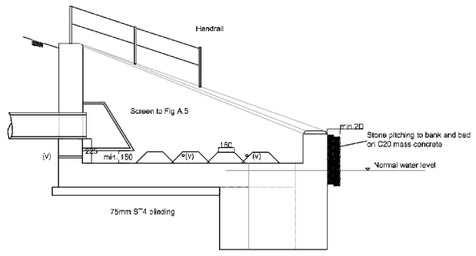


Section 'A-A'

Figure A3: Headwall with Stilling Basin



Plan



Notes:-

(i) Structure should not project into channel
(ii) Wall slope to correspond with bank profile but not steeper than 1:1
(iii) Handrail Ref. Clause 10.5
(iv) Screen Ref. Chapter 8 and Fig A.5
(v) Weep holes through wall if necessary
(vi) Screen may be replaced by a flap valve

Section 'A-A'

Figure A4: Headwall with Baffle Blocks

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INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES

DMRB HEADWALL SCHEMATICS

Figure No **Figure 7**

Version **A**

Appendix 1: Figures 8 to 13

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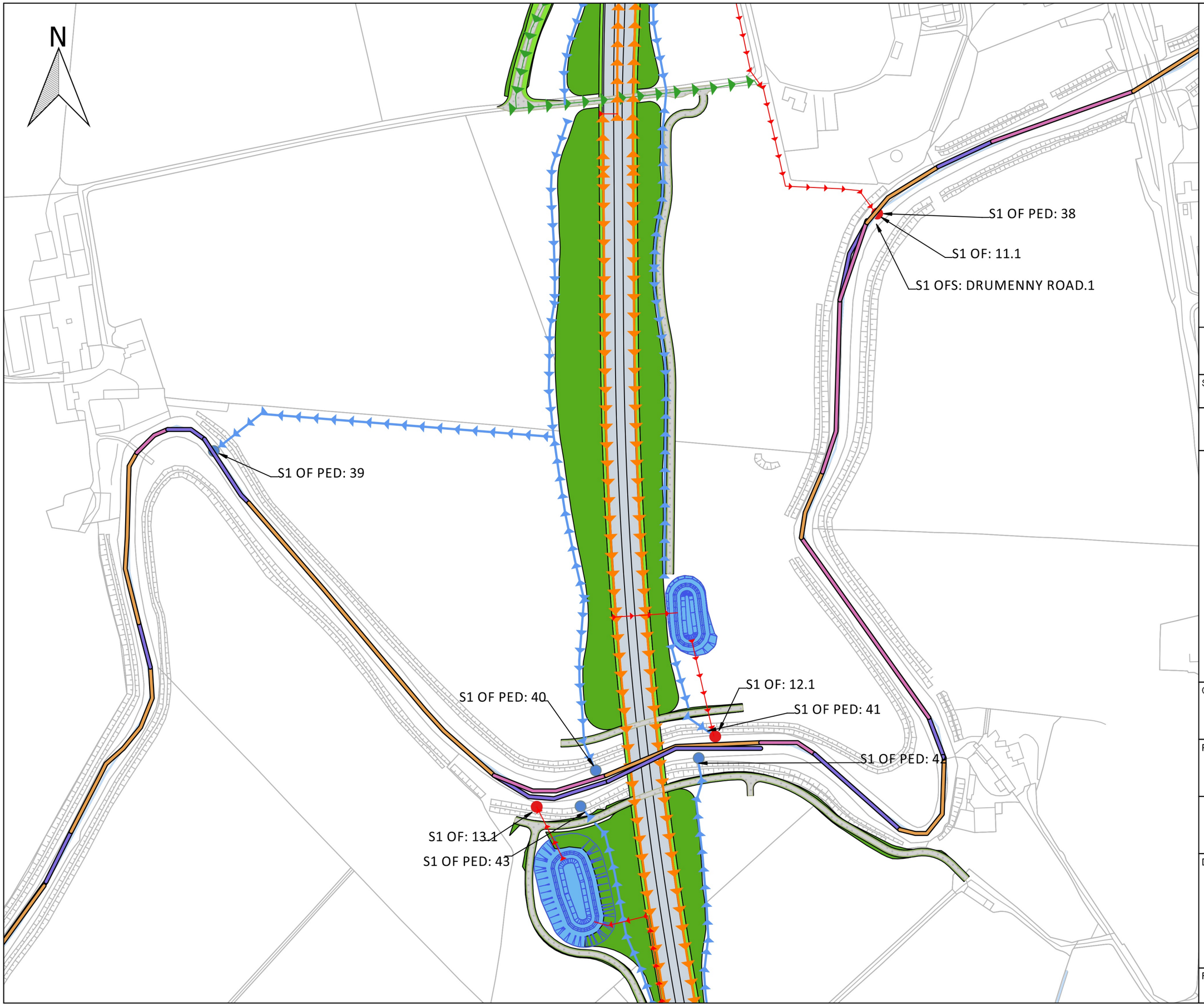


Legend

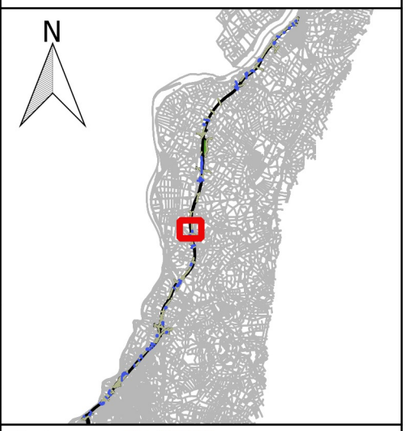
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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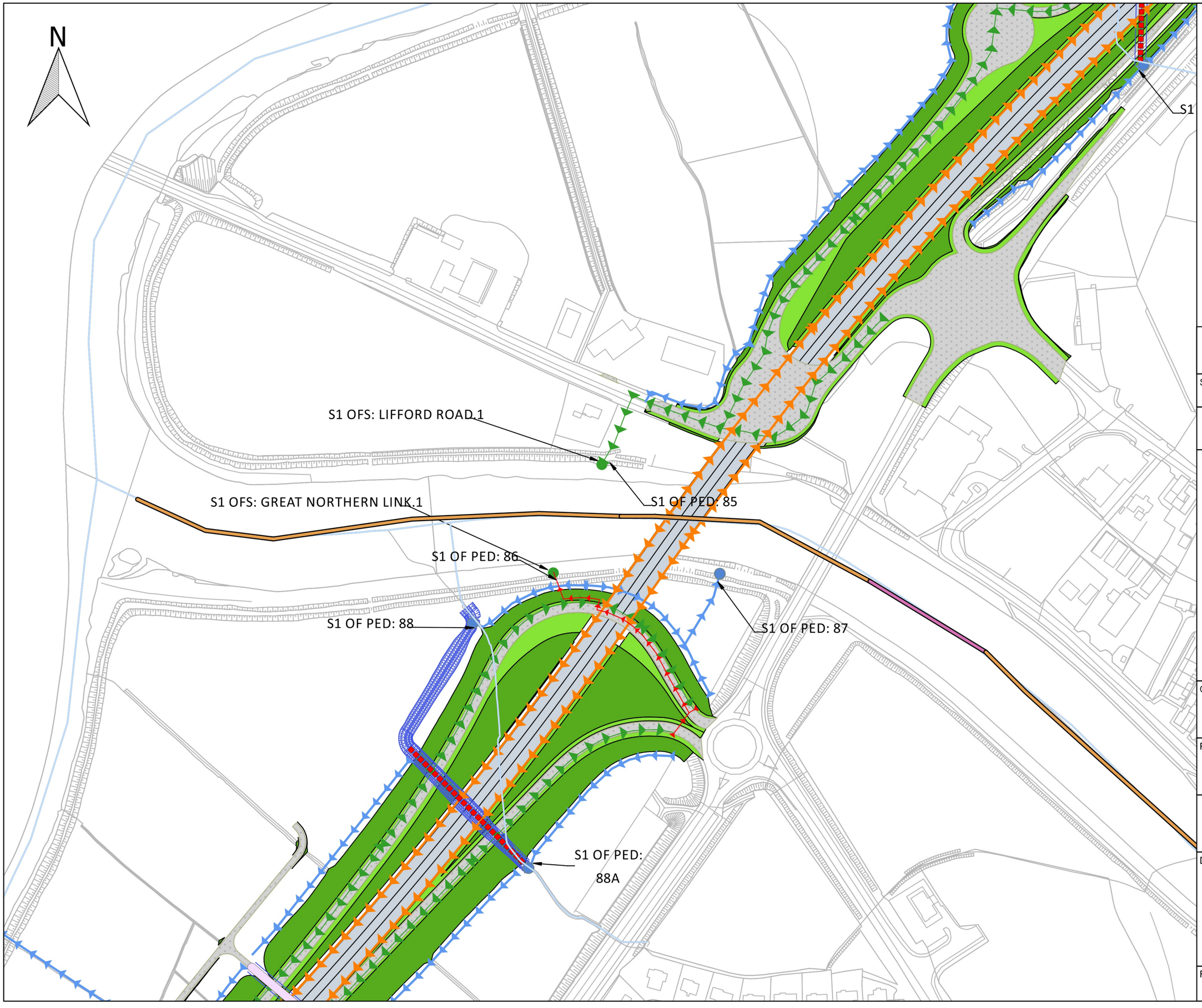
INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES - LOUGHS AGENCY HABITATS SURVEY - BURNDENNETT RIVER

Figure No. **Figure 8**

Version **B**



Legend

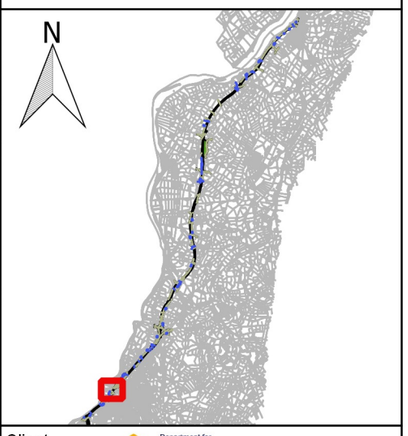
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Culvert
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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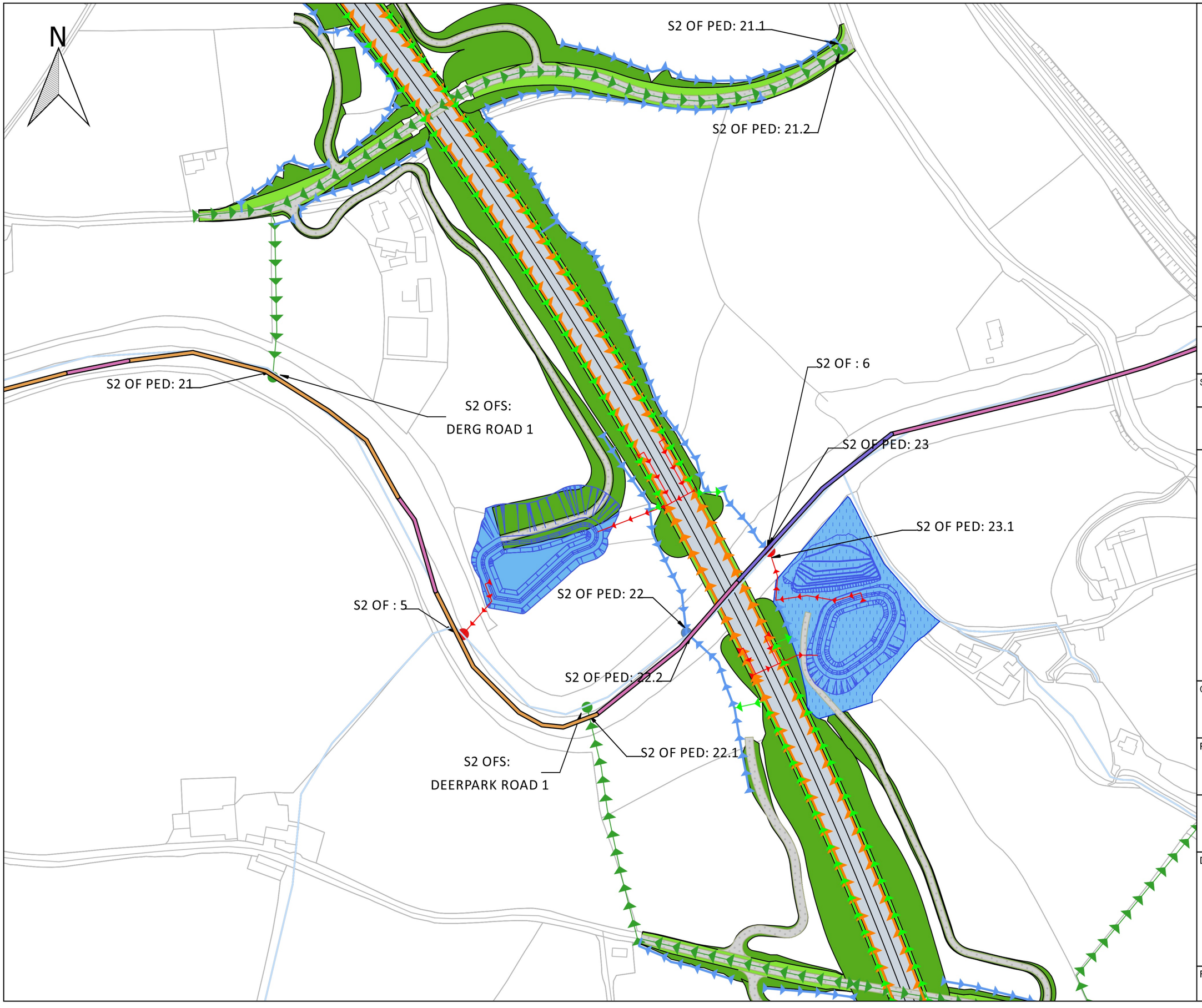
Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT
- SAC WATERCOURSES
- LOUGHS AGENCY HABITATS SURVEY
- MOURNE RIVER

Figure No. **Figure 9**

Version **B**



Legend

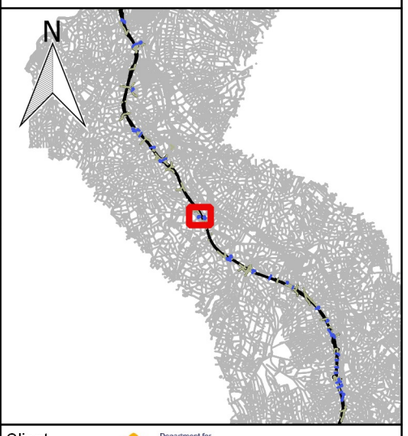
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT
- SAC WATERCOURSES
- LOUGHS AGENCY HABITATS SURVEY
- RIVER DERG

Figure No. **Figure 10**

Version **B**

N

S2 OF PED: 89

S2 OF PED: 90.1

S2 OF: 23.1

S2 OF: 41.1

S2 OF PED: 90

S2 OF PED: 92

S2 OF PED: 93

Legend

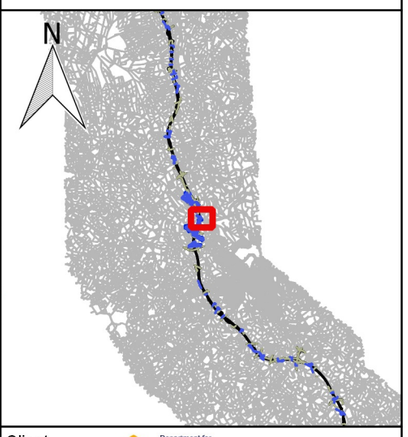
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Connectivity Culvert
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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Project: A5 WTC Western Transport Corridor

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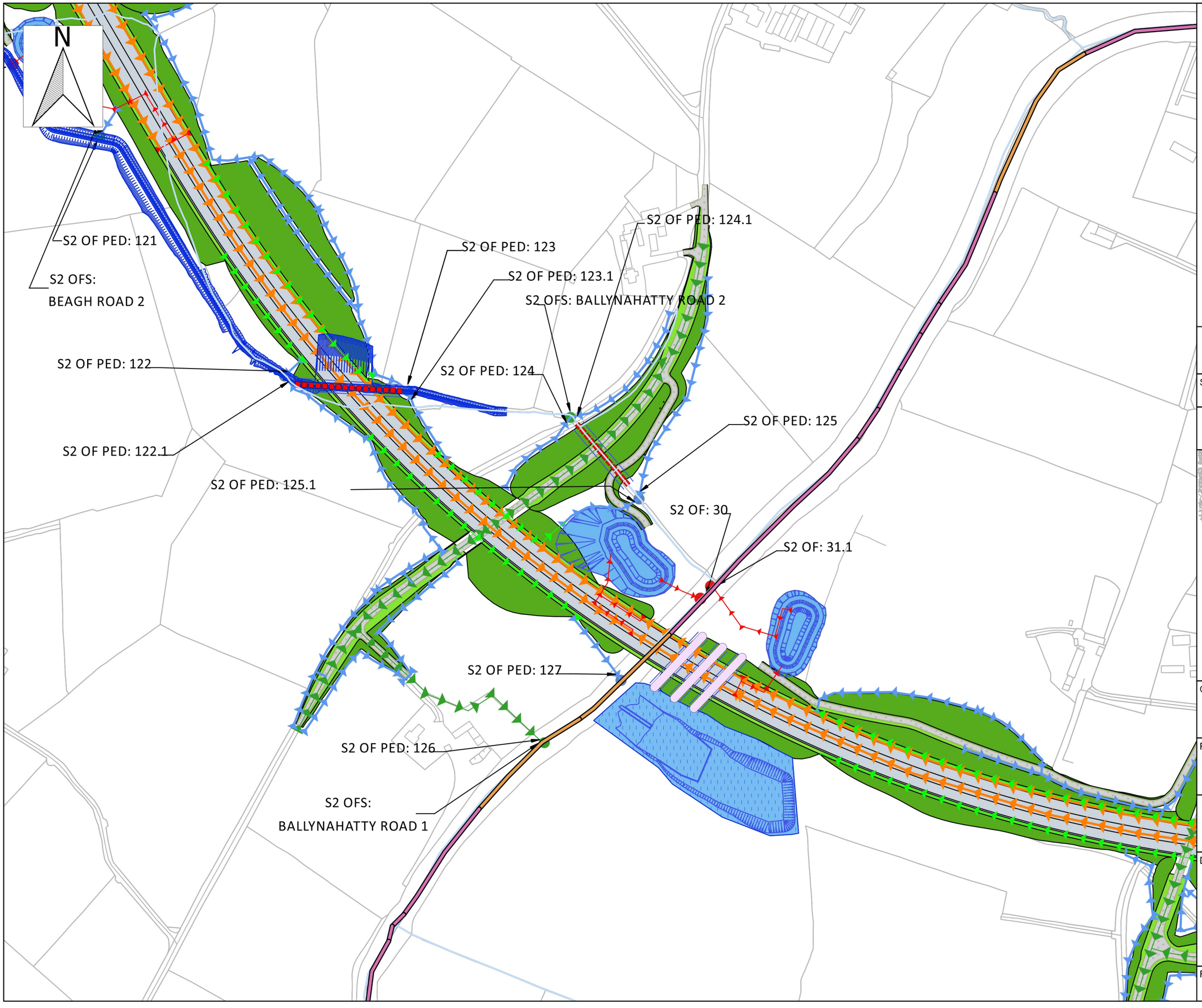
Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT
- SAC WATERCOURSES
- LOUGHS AGENCY HABITATS SURVEY
- FAIRY WATER

Figure No. **Figure 11**

Version **B**



Legend

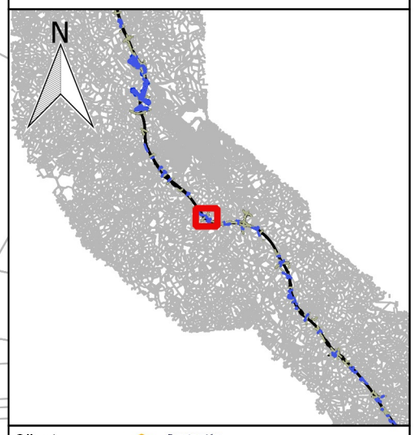
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Culvert
- Connectivity Culvert
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT
- SAC WATERCOURSES
- LOUGHS AGENCY HABITATS SURVEY
- DRUMRAGH

Figure No. **Figure 12**

Version **B**

Legend

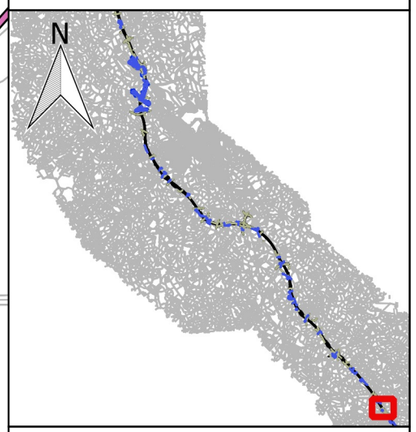
- River Centreline
- PED Drainage
- Cutting ToeDrainage
- Mainline Carrier
- Non Vegetated Drainage System
- Sideroad Drainage
- Culvert
- Connectivity Culvert
- Mainline
- Sideroad
- Embankment
- Verge
- Drainage

Loughs Agency Habitats Survey

- Holding
- Nursery
- Spawning
- Ungraded

Note: The habitat survey information shown on this Figure was provided by the Loughs Agency from an unpublished dataset

Scale @ A3 1:2,500



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Project: A5 WTC Western Transport Corridor

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Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - SAC WATERCOURSES - LOUGHS AGENCY HABITATS SURVEY - ROUTING BURN

Figure No. **Figure 13**

Version **B**

Appendix 2: Culvert Information

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Table A2.1 Salmonid Potential, Watercourse Identification and Crossing Designs

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
New Buildings Stream	S1-PC-01	Y	Box	1.8 x 2.7	540
UD_01	S1-PC-02	N	Box	2.1 x 2.1	1330
Gortin Hall Drain	S1-PC-03	Y	Box	1.8 x 4.5	2485
UD_02	S1-PC-04	N	Pipe	1.5m Ø	3050
UD_02	S1-PC-32	N	Pipe	1.5m Ø	3125
Blackstone Burn	S1-PC-05	Y	Box	2.1 x 3.9	3375
UD_04	S1-PC-37	Y	Box	1.8 x 1.8	3900
UD_04	S1-PC-06	Y	Box	1.8 x 1.8	3900
UD_04	S1-PC-29	Y	Box	1.8 x 1.8	3900
UD_05	S1-PC-07	Y	Box	1.5 x 1.5	5800
UD_05	S1-PC-41	Y	Box	1.5 x 1.5	5800
UD_07	S1-PC-08	Y	Box	2.1 x 3.0	8240
UD_07	S1-PC-38	Y	Box	2.1 x 3.0	8240
Ballydonaghy Drain	S1-PC-09	N	Pipe	1.8m Ø	10900
Ballydonaghy Drain	S1-PC-40	N	Pipe	1.8m Ø	10900
FD_04	S1-PC-10	N	Pipe	1.5m Ø	12600
Strabane Glen Stream	S1-PC-16	Y	Box	2.7 x 3.0	15470
Roundhill Drain	S1-PC-17	N	Box	1.8 x 2.4	15680
FD_13.b	S1-PC-18	N	Pipe	1.8m Ø	16220
Backfence Drain	S1-PC-19	N	Pipe	2.4m Ø	16650

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Nancy Burn	S1-PC-20A	N	Pipe	0.6m Ø	17090
Nancy Burn	S1-PC-20B	N	Pipe	1.2m Ø	17090
Nancy Burn	S1-PC-20C	N	Pipe	0.6m Ø	17090
Nancy Burn	S1-PC-33	N	Box	2.4 x 3.9	17090
Nancy Burn	S1-PC-42	N	Box	2.4 x 3.9	17090
Park Road Drain	S1-PC-22	N	Pipe	1.5m Ø	17380
UD_08	S1-PC-23	N	Pipe	1.8m Ø	18180
Urney Road Drain	S1-PC-24	N	Box	2.4 x 2.4	18720
UD_10	S1-PC-25	Y	Pipe	1.8m Ø	19230
Flushtown	S1-PC-27	Y	Box	2.1 x 3.6	20900
UD_12	S1-PC-28	Y	Box	2.1 x 2.1	21990
UD_13.1	S2-PC-54	N	Pipe	0.6m Ø	28100
UD_15	S2-PC-01	Y	Open Span	2.4 x 5.4	29800
UD_16	S2-PC-55	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-48	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-56	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-58	N	Pipe	1.2m Ø	30150
UD_17	S2-PC-02	Y	Box	1.8 x 2.7	30820
UD_19	S2-PC-03	Y	Box	2.1 x 3.3	31500
UD_19	S2-PC-49	Y	Box	2.4 x 3.6	31500

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Scotts Mill Layde	S2-PC-07	N	Pipe	1.5m Ø	37500
UD_21	S2-PC-08	N	Box	1.2 x 2.1	38250
Back Burn (UD_22)	S2-PC-09	Y	Box	1.8 x 1.8	39250
Back Burn (UD_22)	S2-PC-60	Y	Box	1.8 x 1.8	39250
UD_23	S2-PC-10	Y	Box	1.8 x 1.8	40600
UD_24	S2-PC-11	N	Pipe	1.8m Ø	41250
UD_26	S2-PC-12	Y	Open Span	1.8 x 3.3	41850
UD_28	S2-PC-13	Y	Box	1.2 x 1.2	42600
UD_29	S2-PC-14	Y	Box	1.2 x 1.5	42850
UD_31	S2-PC-16	Y	Box	1.5 x 1.5	43150
UD_32	S2-PC-17	Y	Box	1.8 x 2.4	43370
UD_33	S2-PC-18	Y	Box	1.5 x 1.5	43780
UD_34	S2-PC-19	N	Pipe	1.2m Ø	43950
UD_35a	S2-PC-50	Y	Box	1.2 x 1.2	44200
UD_36	S2-PC-20	Y	Box	1.5 x 1.8	44500
UD_37	S2-PC-21	N	Box	2.1 x 3.0	46200
UD_39	S2-PC-22	Y	Box	1.8 x 3.0	46440
UD_40	S2-PC-47	Y	Box	2.1 x 2.1	47300
UD_43.1	S2-PC-59	Y	Box	2.1 x 2.1	47300
UD_45	S2-PC-26	Y	Box	1.5 x 1.5	48890

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Tully Drain	S2-PC-27	Y	Box	3.9 x 5.1	48950
Tully Drain	S2-PC-53	Y	Box	3.9 x 5.1	48950
Tully Drain	S2-PC-28	Y	Box	3.9 x 5.1	48950
Aghnamoyle Drain	S2-PC-29	N	Box	4.5 x 5.1	51025
UD_52	S2-PC-32	Y	Box	1.2 x 1.2	53200
UD_54	S2-PC-34	Y	Box	1.5 x 1.5	53700
UD_54	S2-PC-51	Y	Box	1.5 x 1.5	53700
Fireagh Drain	S2-PC-57	Y	Box	2.1 x 3.0	53900
Fireagh Drain	S2-PC-36	Y	Box	2.1 x 3.0	53900
UD_55	S2-PC-38	N	Pipe	1.5m Ø	54320
UD_56	S2-PC-39	N	Box	1.5 x 1.5	55250
Loughmuck	S2-PC-43	N	Box	1.8 x 1.8	56000
Loughmuck	S2-PC-44	N	Box	1.8 x 2.4	56000
Freughmore Drain	S2-PC-45	Y	Box	2.4 x 2.4	57300
UD_57.3	S3-PC-84	Y	Box	1.8 x 1.8	61850
UD_57.2	S3-PC-56	Y	Box	1.8 x 1.8	61850
UD_58	S3-PC-51	N	Box	1.5 x 3.0	62550
UD_109	S3-PC-52	Y	Box	2.1 x 2.1	64080
Ranelly Drain_0.5	S3-PC-53	Y	Box	2.7 x 3.3	64390
Ranelly Drain_0.5	S3-PC-74	Y	Box	2.7 x 3.3	64390
Ranelly Drain_0.5	S3-PC-82	Y	Box	2.7 x 4.2	64390

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Ranelly Drain 1	S3-PC-06	Y	Box	2.7 x 3.0	64980
Ranelly Drain 2	S3-PC-07	Y	Box	2.4 x 2.7	65650
Ranelly Drain 2.1	S3-PC-08	Y	Box	2.1 x 5.1	65650
Ranelly Drain 3	S3-PC-10	Y	Box	2.1 x 2.7	65650
UD_60	S3-PC-11	N	Box	1.8 x 1.8	66870
UD_61	S3-PC-12	Y	Pipe	1.5m Ø	67650
Letfern (UD_61.2)	S3-PC-14	Y	Box	2.1 x 3.6	68650
Letfern (UD_61.2)	S3-PC-58	Y	Box	2.1 x 3.6	68650
Letfern (UD_61.2)	S3-PC-15	Y	Box	1.5 x 1.5	68650
Letfern (UD_61.2)	S3-PC-66	Y	Box	1.5 x 1.5	68650
UD_62	S3-PC-16	N	Pipe	2.4m Ø	69700
UD_63	S3-PC-17	N	Box	1.8 x 1.8	69700
UD_65	S3-PC-18	N	Box	1.5 x 2.7	70200
UD_67A	S3-PC-83	Y	Box	1.8 x 1.8	71100
UD_67A	S3-PC-50	Y	Box	1.8 x 1.8	71100
UD_67	S3-PC-19	Y	Box	1.8 x 1.8	71100
UD_68	S3-PC-21	Y	Box	1.8 x 1.8	72090
UD_69	S3-PC-22	Y	Box	1.8 x 1.8	72380
UD_71	S3-PC-23	Y	Box	2.1 x 2.7	73770
UD_72.2	S3-PC-64	Y	Box	2.4 x 3.0	74100
UD_72	S3-PC-65	Y	Box	2.4 x 3.0	74100

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
UD_110.3	S3-PC-72	Y	Box	3.3 x 3.3	74100
UD_110	S3-PC-54	Y	Box	2.1 x 2.4	74100
UD_110	S3-PC-60	Y	Box	2.1 x 2.4	74100
UD_75.3	S3-PC-55	Y	Box	1.8 x 1.8	77000
UD_76	S3-PC-29	Y	Box	2.1 x 2.1	78210

Notes:

1. Culvert embedment depths within watercourses with salmonid interest is 350mm (as agreed with Loughs Agency), for all other watercourses the culvert embedment depth should be 150mm.
2. Some watercourses with no salmonid potential recorded and/or agreed with Loughs Agency require box culverts for flood management proposes.

Appendix 3 – Watercourse Diversion Information

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Table A3.1 Watercourse Diversions

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
New Buildings Stream	Y	S1-WD-17	S1-PC-01	540
UD_01	N	S1-WD-01	S1-PC-02	1330
Gortin Hall Drain	Y	S1-WD-16	S1-PC-03	2485
UD_02	N	S1-WD-02	S1-PC-04 & 32	3050
Blackstone Burn	Y	S1-WD-03	S1-PC-05	3375
UD_04	Y	S1-WD-05	S1-PC-06, 29 & 37	3900
UD_05	Y	S1-WD-06	S1-PC-07 & 41	5800
UD_07	Y	S1-WD-07	S1-PC-08 & 38	8240
Ballydonaghy Drain	N	S1-WD-08	S1-PC-09 & 40	10900
UD_08	N	S1-WD-18	S1-PC-23	18180
Urney Road Drain	N	S1-WD-14	S1-PC-24	18720
UD_12	Y	S1-WD-19	S1-PC-28	21990
UD_15	Y	S2-WD-43	None	29800
UD_15	Y	S2-WD-01	S2-PC-01	29900
UD_19	Y	S2-WD-33	S2-PC-03 & 049	31500
Scotts Mill Layde	N	S2-WD-05	S2-PC-07	37500
UD_21	N	S2-WD-34	S2-PC-08	38250
UD_23	Y	S2-WD-08	S2-PC-10	40600
UD_25	N	S2-WD-35	None	41590
UD_26	Y	S2-WD-09	S2-PC-12	41850
UD_28	Y	S2-WD-10	S2-PC-13	42600
UD_29	Y	S2-WD-36	S2-PC-14	42850
UD_31	Y	S2-WD-41	S2-PC-16	43150
UD_32	Y	S2-WD-42	S2-PC-17	43370

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_33	Y	S2-WD-37	S2-PC-18	43780
UD_34	N	S2-WD-38	S2-PC-19	43950
UD_35.1	Y	S2-WD-11	S2-PC-50	44200
UD_36	Y	S2-WD-13	S2-PC-20	44500
UD_37	N	S2-WD-14	S2-PC-21	46200
UD_38	Y	S2-WD-15	None	46440
UD_40	Y	S2-WD-16	S2-PC-47	47300
UD_42	Y	S2-WD-18	None	47300
UD_45	Y	S2-WD-19	S2-PC-26	48890
Tully Drain	Y	S2-WD-39	S2-PC-27, 53 & 28	48950
Tully Drain	Y	S2-WD-20	None	498950
Fairy Water	Y	S2-WD-21	None	50135
UD_50	Y	S2-WD-25	None	52700
UD_52	Y	S2-WD-40	S2-PC-32	53200
UD_54	Y	S2-WD-26	S2-PC-34 & 51	53700
Fireagh Drain	Y	S2-WD-27	S2-PC-36 & 57	53900
UD_55	N	S2-WD-28	S2-PC-38	54200
UD_56	N	S2-WD-29	S2-PC-39	55250
Loughmuck	N	S2-WD-30	S2-PC-43 & 44	56000
Freughmore Drain	Y	S2-WD-31	S2-PC-45	57300
UD_57.3	Y	S3-WD-32	S3-PC-84	61850
UD_57.2	Y	S3-WD-66	S3-PC-56	61850
UD_58	N	S3-WD-43	None	62550
UD_108	N	S3-WD-44	None	62650
UD_108	N	S3-WD-70	None	62550

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_109	Y	S3-WD-45	S3-PC-52	64080
Ranelly Drain 0.5	Y	S3-WD-46	S3-PC-53, 74 & 82	64390
UD_119	Y	S3-WD-04	None	64980
Ranelly Drain 1	Y	S3-WD-05	S3-PC-06	64980
Ranelly Drain 2	Y	S3-WD-06	S3-PC-07	65650
Ranelly Drain 2.1	Y	S3-WD-07	S3-PC-08	65650
Ranelly Drain 2.3	Y	S3-WD-08	None	65650
Ranelly Drain 3	Y	S3-WD-09	S3-PC-10	65650
Ranelly Drain 3.1	Y	S3-WD-10	None	65650
UD_60	N	S3-WD-75	S3-PC-11	66700
UD_61	Y	S3-WD-11	S3-PC-12	67650
Letfern (UD_61.2)	Y	S3-WD-47	S3-PC-15 & 66	68650
Letfern (UD_61.2)	Y	S3-WD-12	S3-PC-14	68650
Letfern (UD_61.2)	Y	S3-WD-48	S3-PC-58	68650
UD_62	N	S3-WD-13	S3-PC-16	69700
UD_63	N	S3-WD-14	S3-PC-17	69700
UD_65	N	S3-WD-16	S3-PC-18	70200
UD_66	Y	S3-WD-17	None	70200
UD_67A	Y	S3-WD-18	S3-PC-50 & 83	71100
UD_67	Y	S3-WD-19	S3-PC-19	71100
UD_68	Y	S3-WD-20	S3-PC-21	72090
UD_69	Y	S3-WD-21	S3-PC-22	72380
UD_70	Y	S3-WD-22	None	73000
UD_71	Y	S3-WD-49	S3-PC-23	73770
UD_110.3	Y	S3-WD-51	S3-PC-72	74900

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_110	Y	S3-WD-50	S3-PC-54 & 60	74900
UD_113.1	Y	S3-WD-53	None	76950
UD_75.3	Y	S3-WD-54	S3-PC-55	77000

Appendix 4 – Outfall Information

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Table A4.1 Summary of Individual HAWRAT, EQS and Downstream 'In-River' Sediment Assessment Results

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S1 OF 01.1	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 02.1A	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 2.1B	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 25	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	1	0.22	Pass	0.77	Pass	7	Pass
S1 OF 40	2	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.22	Pass	0.75	Pass	3	Pass
S1 OF 26.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.21	-	0.28	Pass	0.84	Pass	7	Pass
S1 OF 05.2	7	Y	Swales/Grassed Channels & Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.61	Pass	2.16	Pass	7	Pass
S1 OF 07.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.65	Pass	2.28	Pass	9	Pass
S1 OF 08.1	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.15	Pass	0.52	Pass	7	Pass
S1 OF 10.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.21	Pass	0.75	Pass	7	Pass
S1 OF 11.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.08	3	0.00	Pass	0.01	Pass	4	Pass
S1 OF 12.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.07	1	0.00	Pass	0.00	Pass	4	Pass
S1 OF 13.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.07	2	0.00	Pass	0.00	Pass	4	Pass
S1 OF 42.1	7	Y	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	53	0.43	Pass	1.51	Pass	8	Pass
S1 OF 15.1	5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass
S1 OF 16.2	5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S1 OF 17.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	53	0.16	Pass	0.57	Pass	10	Pass
S1 OF 27.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.38	Pass	1.35	Pass	9	Pass
S1 OF 27A	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.12	Pass	0.41	Pass	8	Pass
S1 OF 29.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.18	Pass	0.62	Pass	8	Pass
S1 OF 39	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.09	33	0.24	Pass	0.86	Pass	8	Pass
S1 OF 31.1	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.08	37	0.53	Pass	1.86	Pass	9	Pass
S1 OF 32.1	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.07	14	0.25	Pass	0.89	Pass	7	Pass
S1 OF 33.1	7	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	14	0.32	Pass	1.15	Pass	7	Pass
S1 OF 34.1	7	N	Dry/Detention Pond & Wet/Retention Pond	Pass	Pass	Pass	0.04	53	0.85	Pass	3.01	Pass	9	Pass
S1 OF 36.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	3	0.00	Pass	0.00	Pass	7	Pass
S1 OF 37.1	7	Y	Swales/Grassed Channels	Pass	Pass	Pass	0.03	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 41	7	Y	Swales/Grassed Channels	Pass	Pass	Pass	0.03	1	0.00	Pass	0.00	Pass	7	Pass
S1 OF 22.2	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	3	0.00	Pass	0.00	Pass	7	Pass
S1 OF 23.1	9.6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	90	0.81	Pass	2.85	Pass	13	Pass
S1 OF 38	9.6	Y	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.13	9	0.26	Pass	0.9	Pass	10	Pass
S1 OF 24.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.74	Pass	2.61	Pass	12	Pass
S2 OF 01	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.81	Pass	2.87	Pass	11	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S2 OF 02	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.27	-	0.1	Pass	0.54	Pass	7	Pass
S2 OF 03	6	Y	Swales/Grassed Channels & Wet/Retention Pond	Pass	Pass	Pass	0.14	-	0.42	Pass	1.47	Pass	6	Pass
S2 OF 04	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.21	-	0.35	Pass	1.23	Pass	8	Pass
S2 OF 05	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.02	5	0.00	Pass	0.00	Pass	6	Pass
S2 OF 06	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	5	0.00	Pass	0.00	Pass	6	Pass
S2 OF 08.1	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	19	0.02	Pass	0.08	Pass	6	Pass
S2 OF 09	8	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	41	0.48	Pass	1.7	Pass	9	Pass
S2 OF 10	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.38	-	0.31	Pass	1.08	Pass	10	Pass
S2 OF 33	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.3	Pass	1.04	Pass	9	Pass
S2 OF 34	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.6	Pass	2.09	Pass	9	Pass
S2 OF 11	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.4	-	0.16	Pass	0.57	Pass	8	Pass
S2 OF 13	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.66	Pass	2.32	Pass	13	Pass
S2 OF 35	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.34	-	0.7	Pass	2.47	Pass	19	Pass
S2 OF 39	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.87	Pass	3.08	Pass	19	Pass
S2 OF 18	9	N	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.33	Pass	1.17	Pass	11	Pass
S2 OF 19	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.33	Pass	1.16	Pass	10	Pass
S2 OF 21.1	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.25	Pass	0.88	Pass	11	Pass
S2 OF 22	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.13	Pass	0.46	Pass	11	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S2 OF 23.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	5	0.00	Pass	0.01	Pass	9	Pass
S2 OF 41.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	3	0.00	Pass	0.01	Pass	9	Pass
S2 OF 24	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.01	23	0.06	Pass	0.2	Pass	10	Pass
S2 OF 25.1	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	1.32	Pass	0.38	Pass	10	Pass
S2 OF 27	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.15	-	0.12	Pass	0.43	Pass	10	Pass
S2 OF 29	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.37	Pass	1.29	Pass	11	Pass
S2 OF 37	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.09	64	0.57	Pass	1.99	Pass	13	Pass
S2 OF 38.1	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.09	34	0.29	Pass	1.03	Pass	11	Pass
S2 OF 30	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	3	0.00	Pass	0.00	Pass	7	Pass
S2 OF 31.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	2	0.00	Pass	0.00	Pass	7	Pass
S2 OF 32	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.24	Pass	0.84	Pass	11	Pass
S3 OF 21	8	N	Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.73	Pass	2.58	Pass	12	Pass
S3 OF 02.1	8	Y	Dry/Detention Pond	Pass	Pass	Pass	0.20	-	0.19	Pass	0.57	Pass	9	Pass
S3 OF 22.2	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.34	-	0.22	Pass	0.76	Pass	9	Pass
S3 OF 03.3	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.75	Pass	2.65	Pass	20	Pass
S3 OF 04.1	8	N	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.71	Pass	2.50	Pass	11	Pass
S3 OF 05.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.22	-	0.13	Pass	0.45	Pass	9	Pass
S3 OF 06.1	7	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.13	-	0.52	Pass	1.82	Pass	7	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S3 OF 23.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.29	Pass	1.02	Pass	10	Pass
S3 OF 07	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.42	-	0.02	Pass	0.7	Pass	6	Pass
S3 OF 24.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.22	-	0.42	Pass	1.47	Pass	9	Pass
S3 OF 08.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.7	Pass	2.48	Pass	16	Pass
S3 OF 09.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.16	-	0.35	Pass	1.23	Pass	10	Pass
S3 OF 10	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.17	Pass	0.6	Pass	10	Pass

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)

Note: The mitigation noted in column 4 of the table above is provided for water quality purposes, many of the ponds will also have flow attenuation designed into them as required.

Table A4.2 Summary of Cumulative HAWRAT & EQS Assessment Results

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S1 OF 01.1 S1 OF 02.1A S1 OF 02.1B	3 x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.00	Pass	7	Pass
S1 OF 02.1A S1 OF 02.1B S1 OF 25	3 x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.00	Pass	7	Pass
S1 OF 11.1 S1 OF 12.1 S1 OF 13.1	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.01	Pass	4	Pass
S1 OF 12.1 S1 OF 13.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.7	3	0.00	Pass	0.01	Pass	4	Pass
S1 OF 15.1 S1 OF 16.2	2x Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S1 OF 17.1 S1 OF 27.1 S1 OF 27A	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.55	Pass	1.93	Pass	10	Pass
S1 OF 27.1 S1 OF 27A S1 OF 29.1	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.56	Pass	1.96	Pass	10	Pass
S1 OF 33.1 S1 OF 34.1	Swales/Grassed Channels 2x Wet/Retention Pond Dry/Detention Pond	Pass	Pass	Pass	0.04	66	0.91	Pass	3.25	Pass	9	Pass
S1 OF 22.2 S1 OF 41 S1 OF 37.1 S1 OF 36.1	2x Wet/Retention Pond, 2x Swales/ Grassed Channels	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.01	Pass	7	Pass
S1 OF 23.1 S1 OF 38	2 x Wet/Retention Pond & Swales/Grassed Channels	Pass	Pass	Pass	0.03	99	0.86	Pass	3.04	Pass	13	Pass
S2 OF 05 S2 OF 06	2x Wet/Retention Pond	Pass	Pass	Pass	0.02	10	0.00	Pass	0.01	Pass	6	Pass
S2 OF 21.1 S2 OF 22	2x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.34	Pass	1.2	Pass	12	Pass

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S2 OF 23.1 S2 OF 41.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.06	8	0.01	Pass	0.02	Pass	9	Pass
S2 OF 24 S2 OF 25.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.41	Pass	1.44	Pass	11	Pass
S2 OF 29 S2 OF 27	2x Wet/Retention Pond	Pass	Pass	Pass	n/a	n/a	0.44	Pass	1.55	Pass	12	Pass
S2 OF 30 S2 OF 31.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.04	5	0.01	Pass	0.04	Pass	7	Pass
S3 OF 10 S3 OF 09.1	2x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.46	Pass	1.61	Pass	11	Pass

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)

Note: The mitigation noted in column 4 of the table above is provided for water quality purposes, many of the ponds will also have flow attenuation designed into them as required.

Appendix 5 - Draft Construction Environmental Management Plan (CEMP)

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A5 Western Transport Corridor

Draft Construction Environmental Management Plan (CEMP)

November 2017

Produced for

Department for Infrastructure

Prepared by

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CONTENTS

GLOSSARY OF TERMS AND ABBREVIATIONS

A5WTC	A5 Western Transport Corridor
CEMP	Construction Environmental Management Plan
CEEQUAL	The Civil Engineering Environmental Assessment and Awards Scheme
COSHH	The Control of Substances Hazardous to Health Regulations
DRD	The Department for Regional Development
ECoW	Ecological Clerk of Works
EM	Environmental Manager
ES	Environmental Statement
HSEQ	Health, Safety, Environment and Quality Management
MER	Management Environmental Representative
NIEA	Northern Ireland Environment Agency
PMP	Project Management Plan
SWMP	Site Waste Management Plan

1 INTRODUCTION

1.1 Project Summary

The Department for Infrastructure (DfI) Roads is proposing improvements to the A5 Corridor. The proposed scheme includes the construction of 85km of new build road at dual carriageway standard (the A5 Western Transport Corridor (A5WTC)).

The scheme has been divided into three sections for the purposes of delivery, each subject to a separate construction contract.

1.2 Purpose of this Document

Each contractor is required to develop and implement a Construction Environmental Management Plan (CEMP) to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within the Environmental Statement (ES).

It is anticipated that the contractors use this document as the template for their individual CEMP.

Further details specific to the works being undertaken under each of the three construction contracts will be worked up by the Contractors into their CEMP as the scheme progresses.

1.3 Scope of the Construction Environmental Management Plan (CEMP)

This document provides a summary of the generic principles applicable to all three contracts and provides guidance on a consistent approach to ensure that the requirements of the ES are incorporated in the CEMP and within method statements prepared by each of the three Contractors.

The CEMP will document the Contractors' plans to ensure compliance with their legal and contractual obligations as well as implement best practice in construction environmental management.

The CEMP will be applicable to all works associated with the A5WTC scheme including those carried out by sub-contractors.

1.4 Structure of the CEMP

The structure of this guidance document mirrors that anticipated for the section CEMP to be prepared by each of the three Contractors. The contents can be summarised as follows:

- Chapter 1 - Introduction
- Chapter 2 - Training and Induction
- Chapter 3 - Consultation and Communication
- Chapter 4 - Environmental Impacts and Mitigation
- Chapter 5 - Pollution Control and Contingency Plan
- Chapter 6 - Auditing and Monitoring of Environmental Performance
- Annex 1 – Environmental Advice Notes

- Annex 2 – Construction Procedures
- Annex 3 – Construction Information

1.5 Roles and Responsibilities

The Contractor is responsible to ensure that all members of the Project Team, including sub-contractors comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfill this requirement.

The Contractor will ensure that all persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified as follows:

1.5.1 Site Manager

The Site Manager's environmental management responsibilities include but are not limited to:

- preparation and implementation of the CEMP;
- close liaison with the Environmental Manager to ensure adequate resources are made available for implementation of the CEMP;
- ensuring that the risk assessments for control of substances hazardous to health regulations (COSHH), noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site; and
- managing the preparation and implementation of method statements. Ensuring that the Environmental Manager reviews all method statements and that relevant environmental protocols are incorporated and appended.

1.5.2 Environmental Manager (EM)

The responsibilities of Environmental Manager include but are not limited to:

- maintaining environmental records;
- providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
- reviewing environmental management content of method statements;
- reporting environmental performance to the Site Manager;
- liaison with statutory and non statutory bodies and third parties with an environmental interest in the scheme; and
- collection and collation of CEEQUAL evidence.

1.5.3 Engineering Staff

The engineers' environmental management responsibilities include but are not limited to:

- reporting any operations and conditions that deviate from the CEMP to the Site Manager;

- taking an active part in site safety and environmental meetings; and
- ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site.

1.5.4 Supervisors

The supervisors' environmental management responsibilities include but are not limited to:

- ensuring all personnel affected by a method statement are briefed and fully understand its content. Monitor operatives for compliance, including sub-contract operatives;
- implementation of environmental management activities required by the CEMP and works method statements; and
- ensuring that all inspections are carried out as prescribed in the CEMP.

1.5.5 Ecological Clerk of Works (ECoW) (part of the Client's supervisory site staff)

The ECoW will be on site when required to monitor work to ensure that no wildlife or habitat to be retained comes to harm and also to provide advice to site workers regarding best practice. Where the ECoW witnesses work that is not being carried out in accordance with best practice techniques or is causing damage to species or retained habitats, the ECoW will immediately call the Site Manager, Environmental Manager and the NEC Project Manager, and where appropriate stop the activity until corrective action is put in place. ECoW duties include, but are not limited to:

- monitoring site works;
- provision of status reports and updates;
- provision of advice to and liaison with workers on site;
- identifying environmental risks and developing environmental controls – including checks for changes in protected species activity/resting places (badger setts, otter holts etc.);
- delivery of environmental training with the Environmental Manager for site personnel and sub-contractors; and
- liaison with the Site Manager.

1.5.6 Archaeologist

The Archaeologist will be on site when required to monitor excavation works and also to provide advice to site workers regarding best practices. The archaeologist's duties include but are not limited to:

- completion of mitigation works; in the form of targeted trial trenching, archaeological excavation and watching briefs, as required;
- production of detailed method statements to define how archaeological mitigation is sequenced with earthworks operations;
- certification of cleared areas prior to commencement of construction works;
- agreeing areas for topsoil strip or the use of toothless buckets;
- ensuring that all scheduled state care monuments and other known archaeological features requiring protection are demarcated with protective fencing and adequate signage;

- provision of induction training to site teams on archaeological controls;
- providing instructions to the site teams on how and when to access expert advice and opinions; and
- examination of incidental or unexpected finds; and agreeing programmes with the Site Manager for investigation and recording of the archaeological remains.

2 TRAINING AND INDUCTION

2.1 Site Induction

All personnel involved in the Scheme will receive environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

2.2 Specific Training and Awareness Raising

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor.

Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities.

A register of completed training is to be kept by the Environmental Manager.

The Site Manager will ensure that environmental emergency plans are drawn up and the Environmental Manager will conduct regular checks to ensure that the plan is effective by means of emergency drills.

3 CONSULTATION AND COMMUNICATION

3.1 Statutory and Non-Statutory Bodies

During the construction works, communication will be required with external parties such as, statutory authorities, interest groups and the public. Communication may take the form of scheduled meetings, site visits and written correspondence.

3.2 Public

The Site Manager shall ensure that the public is kept informed of operations that may have an effect upon them. This may involve letter drops and meetings to keep local residents up to date with progress with the scheme and any new operations that are to be carried out. The Site Manager will provide details of contacts within the project team for the public to contact should any issues arise.

3.3 Statutory Consents, Licences and Permits

The provisions for controlling, pumping and discharging water will be agreed with the Northern Ireland Environment Agency (NIEA). The Contractor will ensure that any licences required are in place prior to works commencing.

3.4 Environmental Alerts

Legislative changes or proposed improvements to manage processes on site that have a bearing on the commitments given in the Environmental Statement or other consultations will be communicated by the Site Manager to the Client.

3.5 Meetings and Records

Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate.

4 ENVIRONMENTAL IMPACTS AND MITIGATION

An environmental review of the Scheme has been completed to identify all the commitments and agreements made within the ES and other consultations. From this, a schedule of environmental commitments has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment during the construction phase. Environmental commitments have also been incorporated by the design team into archaeological, ecological, landscape and other relevant designs and specifications.

5 POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Surface Water Run-off, Groundwater and Silt

All operations on site will be carried out in a manner to minimise the production and discharge of silty waters. In particular, where any dewatering has to be carried out an assessment will be made as to the method of disposal of the waters and agreed with the Site Manager.

The management of surface water run-off will be defined within the operation specific method statement and risk assessment. This will ensure that the right solution is implemented for each works activity.

5.2 Fuel, Oil and Chemical Spillage

All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.

Storage tank levels will be checked before delivery to prevent overfilling and to ensure that the product is delivered to the correct tank.

The storage of materials in the main compound and work sites will be controlled in such a manner to ensure that materials are not damaged prior to use either through vehicle or people movements or through exposure to the elements.

All fuel, oil and chemicals will be stored on an impervious base within a bunded area and secured. The bund shall have a capacity of 110% of the volume of the products stored within it. All tanks and containers will be kept in a secure compound and be protected from vandalism, and will be clearly marked with their contents. Stores shall be located at least 10 metres from any watercourse.

All mobile plant will be refuelled in a designated area on an impermeable surface and away from drains. In case of any spillages there will be a spill response kit available at each refuelling point and within each machine working within the highway corridor. Where it is impractical to refuel within a bunded area, a drip tray will be available to catch any spills caused by over fuelling.

5.3 Concrete/Mortar Washout

There will be a designated area for the washout of concrete wagons, shoots and mortar bins at each work site. This will be either a lined skip or a pit lined with an impervious membrane to prevent the escape of the alkaline and silty waters entering groundwater or surface water. These pits will be located in areas of low groundwater sensitivity. Excess concrete remaining in the delivery wagon at the end of a pour will be returned to a designated collection area. Once each worksite has been completed any solid concrete in the washout area will be broken out and used either as suitable fill or disposed of to a licensed waste facility.

5.4 Material Storage

Stockpiles should be positioned as far away from sensitive receptors as possible and suitable measures implemented to prevent run off and dispersion if left for any length of time. Any powders

should be stored in sealed bags or silos prior to use. All deliveries of dry powder should be undertaken in a manner to minimise dust emissions.

5.5 Emergency Procedures

A Site Environmental Emergency Plan will be prepared prior to construction and communicated to all members of the project team including sub-contractors and Emergency Services, this plan will include specific Oil/Hydrocarbon spill response measures.

The plan will detail the following controls:

- site drainage controls;
- fuel handling procedures;
- incident notification procedures;
- pollution control equipment requirements;
- procedures for the control of dust and mud;
- protection of aquifer; and
- measures to protect watercourses and wildlife from chemical spills or sediment laden run off.

Responsible staff will be trained in emergency procedures to form an Emergency Team, so that these procedures can be implemented swiftly and effectively. Periodic testing of emergency procedures will be undertaken by the Site Manager. The Environmental Manager will observe the test and to report on results. Any corrective actions are taken forward for review and approval.

Should an emergency incident occur, the Environmental Manager will be notified immediately. The emergency response will be co-ordinated by the Site Manager. Protective measures, mitigation, clean up and remediation actions will be identified from the evaluation and shall be put into place, having regard for the sensitivities of the environment. A record of the emergency incident will be kept to show the nature of the corrective action undertaken.

6 ENVIRONMENTAL PERFORMANCE MANAGEMENT

6.1 Environmental Risk Register

The Environmental Manager will prepare and maintain an Environmental Risk Register having regard for legal requirements, project environmental commitments the potential for aspects of works to cause significant environmental impact.

The Environmental Manager will record responsibilities assigned for actions required for mitigation and control of the environmental risks in the Environmental Risk Register.

The Environmental Risk Register will be subject to regular review by the Environmental Manager together with the ECoW and Site Manager.

6.2 Consents and Exemptions

The Scheme will require consents and exemptions from various regulatory bodies in advance of construction activities. Copies of legal consents, permits, assents and licences of exemptions obtained will be held in the site environmental file by the Environmental Manager.

6.3 Method Statements and Risk Assessments

Specific environmental risks will be assessed during preparation of method statements. Actions and environmental constraints associated with specific construction operations will be included in method statements, field control sheets and activity plans where appropriate. Generic environmental requirements will be included in all method statements.

6.4 Inspections

Routine inspections to check that pollution control measures are in place will be undertaken by the Environmental Manager, who will produce weekly inspection reports.

Daily inspections will be made by the supervisors during each shift and any environmental problems or risks that are identified will be actioned as soon as is reasonably practicable. Any issues arising from the daily inspections will be notified to the Environmental Manager.

6.5 Auditing

A Project HSEQ internal audit schedule will be prepared. This will include: audits of the implementation of the CEMP and audits of sub-contractor and supplier environmental performance by the Environmental Manager.

6.6 CEMP Review Programme

The CEMP is a live document that will be updated by the Contractor and reviewed by the Environmental Manager on a monthly basis.

6.7 Environmental Complaints

The Environmental Manager will ensure that all environmental complaints and concerns will be responded to in 24 hours.

6.8 Notices of Non-Conformance

In instances where the requirements of the CEMP are not upheld a Non-Conformance and Corrective Action Notice will be produced. The Notice will be generated during the inspections conducted by the Supervisors, the Site Manager, Environmental Manager or external third-party audits. The Site Manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

6.9 Complaints Handling

The response to any complaints will be managed by the Site Manager, who will inform the Environmental Manager of any environmental complaints.

A Complaints Register will be maintained to detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover.

6.10 Key Performance Indicators and Objectives

The Contractor will set Environmental Objectives in order to continuously improve environmental performance on the site. The Contractor will set objectives based on each significant environmental impact and they will be reviewed, and revised if necessary, on a monthly basis. Procedures, monitoring requirements and key performance indicators will be measured against achievable targets.

ANNEX 1: ENVIRONMENTAL ADVICE NOTES

Annex 1.1 EAN 001 In-stream Works Timing Restrictions

Table A1.1 Tier One In-stream Works Timing Restrictions

River	Section	Chainage	Structure Ref	Crossing Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category"	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Burn Dennet	1	10500	S1/B06	IC 37261 04308	Atlantic salmon; Brown trout; River/Brook lamprey; European eel.	-	Salmonid River	2a	40	Obviously Modified												
Glenmornan	1	12700	S1/B08	IC 36548 01938	Atlantic salmon; Brown trout; European eel.	-	Salmonid River	1b	31	Significantly Modified												
Mourne River	1	17900	S1/B14	IH 33501 98061	Atlantic salmon; Brown trout; European eel; River/Brook lamprey; Gudgeon.	SAC; ASSI	Salmonid River	1b	16	Severely Modified												
River Finn	1	18700 - 19500	No structure	-	Atlantic salmon; Brown trout; River/Brook lamprey.	SAC; ASSI	Salmonid River	1a		Obviously Modified												
River Derg	2	34330	S2/B07	IH 36387 87669	Atlantic salmon; Brown trout; European eel; Perch; Roach.	SAC; ASSI	Salmonid River	1b	39	Predominantly Unmodified												
Fairy Water	2	50100	S2/B19	IH 43178 74923	Atlantic salmon; Brown trout; Roach; Gudgeon; Pike; Perch.	-	Salmonid River	1b	30	Significantly Modified												
Drumragh	2	56590	S2/B28	IH 45772 69866	Atlantic salmon; Brown trout; River/Brook lamprey.	-	Salmonid River	2a	35	Significantly Modified												
Routing Burn	3	71700	S4/B08.1	IH 51977 61401	Atlantic salmon; Brown trout; European eel; River/Brook lamprey.	-	Salmonid River	1b	74	Pristine/semi-natural												

River	Section	Chainage	Structure Ref	Crossing Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category"	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Blackwater	3	93300 - 93600	No structure	IH 66562 50670	Atlantic salmon; brown trout; lamprey sp.; stone loach; minnow; European eel; gudgeon; and white-clawed crayfish.	-			60	Obviously modified												

Table A1.2 Tier Two In-stream Works Timing Restrictions

River	Section	Chainage	Culvert Ref	Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Coolaghy Burn	2	36500	S2/B09.1	IH 36344 87548		-	-	2a	54	Significantly Modified												
Fireagh Burn	2	50200	tbc	IH 42541 73990		-	-	2a	-	-												
	2	51100	tbc	IH 42826 72440		-	-	2a	-	-												
	2	52700 - 54400	tbc	IH 43528 71273		-	-	2a	-	-												
Ramelly Drain	3	64500 - 66000	tbc	IH 48567 68806	Atlantic salmon; Brown trout.	-	-	-	33	Obviously Modified	■	■	■	■	■					■	■	■
Letfern	3	68800	tbc	IH 50401 63942		-	-	1b	36	Severely Modified												
River 30	3	73800 - 74700	tbc	IH 53102 60693		-	-	-	-	-												
River 33	3	78200	tbc	IH 56601 57200	Atlantic salmon, Poss. White claw crayfish.	-	-	-	54	Obviously Modified	■	■	■	■	■	■	■			■	■	■
Roughan River	3	81400	tbc	IH 59651 56381	Atlantic salmon; Brown trout; River/Brook lamprey, Poss. White claw crayfish.	-	-	1a	38	Obviously Modified	■	■	■	■	■	■	■			■	■	■
Ballygawley River	3	83800	S3/17.3, S3/17.4, S3/17.5	IH 61926 55769	Brown trout; European eel. Poss. White claw crayfish.	-	-	1a	44	Significantly Modified	■	■	■	■	■	■	■			■	■	■
River 34	3	86400 - 86600	tbc	IH 64093 54758	Poss. White claw crayfish.	-	-	-	46	Predominantly Unmodified	■	■	■	■	■	■	■				■	■
River 35	3	88100	tbc	IH 65514 53984	Poss. White claw crayfish.	-	-	-	-	-	■	■	■	■	■	■	■				■	■
River 36	3	89500	tbc	IH 66760 53553	Poss. White claw crayfish.	-	-	-	67	Predominantly Unmodified	■	■	■	■	■	■	■				■	■

Table A1.3 Tier Three In-stream Works Timing Restrictions

River	Section	Chainage (approx)	Culvert Ref	Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
River 1	1	550	tbc	IC 41143 12785		-	-	-	-	-	*											
River 2	1	2500	tbc	IC 39783 11389		-	-	-	74	Significantly Modified	*											
Blackstone Burn	1	3350	tbc	IC 39247 10773		-	-	-	73	Significantly Modified	*											
River 4	1	5850	tbc	IC 37706 08892		-	-	-	-	-	*											
River 5	1	8300	tbc	IC 37324 06483		-	-	-	-	-	*											
River 9	1	tbc	tbc	IH 33492 94493		-	-	-	-	-	*											
River 10	2	29800	tbc	IH 33553 91041		-	-	-	57	Severely Modified	*											
Liscreevaghan Burn	2	31500	tbc	IH 34638 89829		-	-	-	60	Significantly Modified	*											
Back Burn	2	39300	tbc	IH 39779 84955		-	-	-	49	Obviously Modified	*											
River 17	2	40600	tbc	IH 40918 83843		-	-	-	-	-	*											
River 18	2	41300	tbc	IH 41271 83293		-	-	-	-	-	*											
Beltany Burn	2	41900	tbc	IH 41483 82765		-	-	-	-	-	*											
River 20	2	43300	tbc	IH 41653 81476							*											
River 21	2	43500	tbc	IH 41666 81233							*											
River 22	2	44400	tbc	IH 41878 80383		-	-	-	-	-	*											
River 23	2	46300	tbc	IH 42472 78051		-	-	-	71	Significantly Modified	*											
River 25	2	tbc	tbc	IH 41796 77387		-	-	-	-	-	*											
	2	47400	tbc	IH 42577 75694		-	-	-	-	-	*											
River 38	2	56000 - 56400	tbc	IH 45038 69620		-	-	-	-	-	*											
River 27	2	57400	tbc	IH 45999 69314		-	-	-	49	Significantly Modified	*											
River 37	3	89500	tbc	IH 67678 51982	Poss. White claw crayfish.	-	-	-	-	-	[redacted]											[redacted]

Table A1.4 Key for Tier 1, 2, and 3

FFD	Freshwater Fish Directive
WFD	Water Framework Directive
HQA	Habitat Quality Assessment (product from RHS survey)
HMS	Habitat Modification Score (product from RHS survey)

Table A1.5 WFD Risk Categorisation

WFD Risk Category	UKTAG Reporting Category
1. Water bodies at risk of failing to achieve an environmental objective	**(1.a) Water bodies at significant risk** *Note: Identifies water bodies for which consideration of appropriate measures can start as soon as practical*
	(1.b) Water bodies probably at significant risk but for which further information will be needed to make sure this view is correct *Note: Focus for more detailed risk assessments (including, where necessary, further characterisation) aimed at determining whether or not the water bodies in this category are at significant risk in time for the publication of the interim overview of significant water management issues in 2007*
2. Water bodies not at risk of failing to achieve an environmental objective	**(2.a & 2.b) Water bodies not at significant risk on the basis of available information** **(2.a) Water bodies for which confidence in the available information being comprehensive and reliable is low** *Note: Work on these water bodies will be focused on appropriately improving the quality of information on pressures and their likely environmental effects in time for the second pressures and impacts analysis due to be completed in 2013*
	(2.b) Water bodies for which confidence in the available information being comprehensive and reliable is high *Note: Review for the next pressures and impacts analysis report in 2013 to identify any significant changes in the situation*

Annex 1.2 EAN 002 Protected Species Timing Restrictions

Table A1.6 Protected Species Work Timing Restrictions

Species	Section	Chainage	Legal protection	Timing Restriction	Working Windows											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Winter birds	1	5000 - 10500	HRA process	Works will be restricted within 250m of swan or goose activity during October to March inclusive, alongside a watching brief between the chainages specified.	■	■	■							■	■	■
Nesting birds	All	All woody vegetation	WO 85	Woody vegetation clearance September - February			■	■	■	■	■	■				
Nesting Barn owl	All	None found in baseline surveys, but potentially throughout scheme	WO 85	Destruction of existing nests Sep-Feb only; replacement provided up to 1 year in advance of destruction			■	■	■	■	■	■				
Nesting king fishers	All	None found in baseline surveys, but potentially throughout scheme	WO 85	Netting of suitable river banks to prevent summer nesting where necessary			■	■	■	■	■	■				
Otter holts	2	34400 and 50000 confirmed, 17500, 41800 and 71700 likely.	HR 95 & HRA Process	No time restriction on closure, will be dependant upon activity. Licence and creation of artificial holt up to 1 year in advance of holt closure	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Bat roosts**	1	3250 and 19000 confirmed (more likely during veg clearance).	HR 95	Bat licence and creation of artificial roosts up to one year prior to roost closure (Preferred October - April)					■	■	■	■	■			
Badger setts	All	Main setts: 7200, 7700, 34250, 54750, 79500, 81100, 83500 (A4 link road) (more likely during veg clearance)	WO 85	Badger licence up to one year prior to sett closure (only allowed 1st July – 30th November) creation of alternative sett up to 1 year prior to original's closure	■	■	■	■	■	■						■
Smooth newt breeding ponds	2	19500	WO 85	Licence required for trapping and relocation of newts up to one year prior to pond destruction (trapping March-August) creation of alternative pond up to 2 years prior to original's destruction	■	■							■	■	■	■
Red Squirrel dreys	3	possible 34400 and 79400-79700	WO 85	No time restriction on destruction, will be dependant upon activity. Licence up to 1 year in advance of drey destruction	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
White clawed crayfish	3	All water courses 78000 - 93000	WO 85	No works affecting stream May-June. Licence may be required for removal of individuals from works area July - October	■	■	■	■	■	■				■	■	■
Protected flora	1	18000	WO85	Translocation of trees November to Feb			■	■	■	■	■	■	■			

*It will not be possible to locate all breeding sites or resting places prior to vegetation clearance and site construction works. Provision should be made for the unexpected discovery of any of these features.

Bat Roosts** timings only applicable for summer roosts, if maternity or hibernation roosts discovered in update surveys further restrictions will apply.

Table A1.7 Key Indicating Work restrictions

▒	Work Restrictions Dependant Upon Animal Activity
■	Restricted Works
	Recommended Periods for Works

Annex 1.3 EAN 003 Timetables of Ecology Construction Tasks

Table A1.8 Draft Ecology Works Timetable

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
Hedges, woodland and other habitats suitable for nesting birds		vegetation clearance where necessary for 2012 work	vegetation clearance under ecologist supervision, if active nests found clearance cannot go ahead in that location until approved by ecologists	vegetation clearance for 2013 works		vegetation clearance Sep-Feb for 2014 works			
Sch. 8 Protected Plants (requires licence)	update Sch. 8 surveys	Possible translocation dependent upon NIEA licence terms	Set sch. 8 exclusion zones						
Sch. 9 Invasive Species	update Sch. 9 surveys		Set sch. 9 exclusion zones, treatment of areas as required						
Planting			planting around culvert entrances, verges and on exposed earthworks where possible					general scheme planting	
Newts (requires licence)	update ecology surveys (April-May) and construction of 1 x replacement pond		Fencing of newt areas, creation of new hibernacula (April) / trapping and translocation of newts to new pond area and new hibernacula (May-July) / original pond and hibernacula destruction						
Badgers (requires licence)		update badger surveys and sett monitoring				update badger surveys and sett monitoring		update badger surveys and sett monitoring	
	artificial badger sett creation August-Dec 2011 for closure 2012								
	badger sett closure July-Nov incl.								
			installation of measures to maintain badger commuting routes (inc. cover excavations, temp fencing etc)						
			installation of permanent deterrent fencing along scheme boundary and underpasses as required						
Otters (requires licence)	update surveys and otter holt monitoring		otter holt monitoring			otter holt monitoring		otter holt monitoring	

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
		artificial otter holt creation pre October 2011 for closure pre April 2012							
			closure of holts dependent upon activity						
			installation of measures to maintain otter commuting routes (inc. cover excavations, temp fencing etc.)						
			installation of ledges into new culverts during construction to be ready when water courses are diverted						
Bats (requires licence)	update roost surveys								
	artificial roost creation	artificial roost monitoring			artificial roost monitoring		artificial roost monitoring		artificial roost monitoring
		Monitoring for casual summer roost, some trees and buildings destroyed under ecologist supervision							
		Maternity and summer roost closure	Hibernation roost closure	Maternity and summer roost closure					
			installation of measures to maintain bat commuting routes (inc. artificial hedges etc.)						
			scheme planting to involve 'hop overs'						
Aquatic (requires licence)		installation of pollution prevention/sediment traps etc		weekly monitoring of sediment traps					
			trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)
			instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)
Birds	pre-construction update barn owl survey	barn owl nest closure (if required) and construction of artificial nest							
	pre-construction update kingfisher survey	netting of suitable riverbanks for kingfisher							

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
Supervision / clerk of works		ecologist clerk of works supervision as required							
			ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff

Table A1.9 Key Draft Ecology Works Timetable

	Recommended Periods for Works
	Action TBC Following Detailed Design

Annex 1.4 EAN 004 Invasive Species Risk Register

Table A1.10 Invasive Species Risk Register

Species to be added to Sch. 9 Wildlife Order 1985	Risk Category	Latin	Habitat Occurrence	Means of Spread	Impacts	Current Range in Co. Tyrone	Confirmed A5 Locations	Control Methods
Knotweed, Japanese		*Fallopia japonica*	Waste ground, river banks and parks.	vegetative fragments in contaminated soil	Forms extensive stands	Widespread throughout Tyrone.	Burn Dennet (chainage) Mourne (chainage), Strabane Nature Reserve. River Derg (NVC ID Area 26).	Attempting to get rid of stands of Japanese knotweed by digging up or cutting the plant rarely succeeds unless combined with herbicide applications. Fragments of the rhizomes or aerial shoots can regenerate, so must be destroyed by burning. Riverside colonies may spread by fragments floating downstream. The Centre for Aquatic Plant Management (CAPM) recommends control by herbicides as the best option. Transport of soil away from the site containing fragments of Japanese knotweed should be avoided; it might introduce the species to uninfected sites.
Knotweed, Giant		*Fallopia sachalinensis*	Waste ground, river banks, lakesides, old gardens, etc.	Flowers, rhizomes and vegetative fragments in contaminated soil	Forms extensive stands	Scattered throughout Tyrone.	Burn Dennet	Currently the most effective method of control is repeated spraying with herbicides over a number of years, which gradually reduces the vigour of the plant. This is carried out in early autumn, when the herbicide in thought to have the most impact on the plant. New sites and larger stands may also be sprayed in early summer as well, to stunt the growth before the autumn spraying.
Hogweed, Giant		*Heracleum mantegazzianum*	Along riversides, stream banks, and other damp waste sites. In suitable environments, it can be abundant. It can extend along several miles of river bank.	Seed dispersal via water transportation and in soil adhering to shoes and machinery. Seeds can stay viable for several years.	Poisonous to people and animals	Widespread throughout Tyrone.	Large stands along R. Finn and Mourne confluence near Strabane.	Eradication programmes may vary depending on the degree of infestation. Small numbers can be controlled by digging out the whole individual plant; docking the plant to prevent it flowering will divert reserves to ensuring the plant survives to attempt to flower the following year. It is best to cut the stem at below ground level, to ensure that the rootstock is damaged. Larger numbers can be sprayed, preferably when the plants are actively growing and less than 1m tall, with a glyphosate herbicide (this is the only herbicide which can be used near water). This can be done either as a spot treatment, or using long reach sprays. The monitoring of the treated area for several years is necessary, to find new seedlings. Establishing greensward or reseeding with native plants is also beneficial after initial eradication.
Salmonberry		*Rubus spectabilis*	Country parks, river banks, forestry plantations etc.	This plant spreads rapidly by vigorous suckering from the base. It is likely that it could also be spread by careless disposal of garden waste.	Displaces native species.	Widespread throughout Tyrone.	None confirmed.	With well-established large infestations only physical removal involving cutting or digging up the plants, either by hand or mechanically, is feasible. Herbicide should be applied to remaining stumps.
Balsam, Himalayan		*Impatiens glandulifera.*	River banks and lakesides.	There are no special vectors for long-distance dispersal, although dispersal by water is probable. Local dispersal is by seed from existing colonies.	Displaces native species. Bare patches created in winter when the plant dies back may result in increased riverbank erosion.	Widespread throughout Tyrone.	Scattered along route, particularly along watercourses.	Mechanical control, by repeated cutting or mowing, is an effective control, but plants can regrow if the lower parts are left intact. Regular grazing also suppresses this species. Control by herbicides is effective — for detailed advice on this, see the Centre for Aquatic Plant Management web site (Information Sheet 3: Himalayan Balsam). Herbicide should be sprayed before flowering.

Species to be added to Sch. 9 Wildlife Order 1985	Risk Category	Latin	Habitat Occurrence	Means of Spread	Impacts	Current Range in Co. Tyrone	Confirmed A5 Locations	Control Methods
Waterweeds (all species)		*Elodea* (all species)	Still or slow-flowing, shallow or deep water.	vegetative fragments in water courses	Can impede flow, increase flooding, destroy ecosystem and affect recreation	*E. canadensis* scattered throughout Tyrone. *E. nuttallii* rare in Tyrone.	*E. canadensis* abundant in pond adjacent to River Finn H32509673.	*Elodea canadensis* is now an established part of Ireland's aquatic ecosystems. It provides good habitat for many aquatic invertebrates and cover for young fish and amphibians and food for waterfowl. In the case of excessive growth, physical removal is probably the best option, taking care to dispose of the excess material responsibly (by composting or burning). It can also be controlled by suitable herbicides and there is a biological method of control using grass carp (*Ctenopharyngodon idellav*) which graze the plant. Control of *Elodea nuttalli* is similar although this species is less widespread than *E. canadensis* although it is reported to be increasing across the British Isles whilst *E. canadensis* has declined. This has been linked with generally increasing eutrophication of waters.
Knotweed (all species)		*Fallopia* (all species)	Comments as per *F. japonica* and *F. sachalinensis.* Hybrid between these two spp. - *Fallopia x bohemica. F. baldschuanica* (a climber) rarely becomes established in wild.					
Rhubarb, Giant		*Gunnera tinctoria*	Damp grassland, woodland and shaded areas near water	self sown and vegetative fragments	Forms extensiev stands and may impede stream flow	Rare in Tyrone.	River Derg	Mechanical removal and chemical treatment.
Bluebell, Spanish		*Hyacinthoides hispanica*	Woodlands, parkland and gardens.	bulbs in waste soil	Hybridisation with native species	Rarely naturalised in Tyrone. Hybrid with native species is more common. Native sp. is most widespread.	None confirmed.	The complete removal of Spanish or hybrid bluebells from an extensively contaminated site is probably uneconomic and undesirable. The focus of management should be on prevention of further spread into natural woodland or other natural habitats by the removal of garden escapes as and when discovered.

Table A1.11 Invasive Species Risk Categories

High Risk	
Moderate Risk	
Low Risk	

Annex 1.5 EAN 005 Environmental Consents

Table A1.12 EAN 005 Consents

Licence	Info	Responsibility	Programme	Input Required (input and team)
FEPA **FEPA guidance note information:** **http://www.ni-environment.gov.uk/fepa_guidance_notes.pdf** **Construction Licence Application Form:** **http://www.ni-environment.gov.uk/construction_application.pdf** **the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995:** **http://www.ni-environment.gov.uk/ni_wml_consultation_document.pdf**	WMU has suggested that the construction works may occur within 50 metres of the Mean High Water Spring Tide mark of the tidal section of the River Foyle. Therefore you may require a licence issued under Part II of the Food and Environment Protection Act 1985 (A FEPA Licence). This also applies to proposed pipeline outfalls terminating in the sea. WMU's Marine Assessment and Licensing Team should be contacted to determine if the construction works are within this zone and to determine if an FEPA Licence is required. If the works are within 50 m then a **CONSTRUCTION LICENCE** will be required. Some minor works of construction may be exempt from FEPA licensing, these arelisted in the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995, please find attached link in left hand column.	Contractor	It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted **FOUR MONTHS BEFORE LICENCE IS REQUIRED.** Please find attached link in left hand column. FEPA licences cannot be issued retrospectively. Licences are valid for **12 months.** A separate application must be submitted for each stage of construction work. The application will need to be submitted to the environment and heritage team with the following application fee: • Marine Construction: £175 administration fee. The application fee must be paid **before** the application can be processed.	The following information is required for the construction licence application: Project costs (Project Manager) Environmental Statement; only If the project is subject to a planning application (Environment Team) Description of materials to be deposited (Design Engineers) Method of construction; is needed if the project involves land reclamation (Construction Engineers)
Discharge Consent **Discharge Consent application form:**	The scheme will require discharge consent, issued under the Water (Northern Ireland) order 1999, prior to commencement of any works. Discharge	Contractor	It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted **FOUR MONTHS BEFORE LICENCE IS REQUIRED.** Please find attached link in left	The following information is required for the discharge consent licence application: Need to state the nature of the discharge, type amount etc (waste team)

Licence	Info	Responsibility	Programme	Input Required (input and team)
http://www.ni-environment.gov.uk/discharge_consent_gn.pdf **Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes site drainage):** **http://www.ni-environment.gov.uk/wo1-annex2-trade-effluent-and-site-drainage.pdf**	consents will also be required for any temporary toilets or wash areas that discharge to the aquatic environment. The scheme is most likely to fall under Annex 2 of the discharge consent application.		hand column. The Department has **four months** from the date on which a valid application is received (or such further period as may be agreed in writing between the applicant and the Department) to determine the application, otherwise it is deemed to have been refused by the department. **Annex 2** (WO1 – Annex 2 Trade Effluent Discharge, includes **site drainage**) should be completed in addition to the main application form. A separate application form and fee must be submitted for each type of effluent discharge. Please find attached link in left hand column.	Site details including site drainage (Engineers) Details of receiving Environment and impacts (Environment Team)
Abstraction /impoundment **Abstraction/Impoundment Application form:** **http://www.ni-environment.gov.uk/licence_abstract_impound_water.pdf**	If the scheme involves abstraction (e.g. dewatering of an excavation) or an impoundment a pool of water formed by a dam or pit) an appropriate abstraction/impoundment license may be required.	Contractor	It is recommended that contact of the Abstraction and Impoundment Licensing Team of WMU takes place as soon as possible. For Impoundment and Abstraction a Comprehensive Application for a Licence to Abstract and/or Impound Water F0002 will be required. Please find attached link in left hand column. The form will **NOT** be required if extraction is below **10m³ per day** (conditions in annex A) Please find attached link in left hand column. With effect from 1st April 2010 the following charges will apply: • A flat rate fee of £135 for all abstraction • applications of 20 cubic metres per day or more. • A fee of £30 for any variations to an existing licence. • For abstractions greater than 100 cubic metres per • day an annual charge may apply	The following information is required for the discharge consent licence application: Proposed and existing abstraction/impoundments of water. Abstraction volume details including volume per day for surface, estuarine or coastal waters and groundwater. Monthly Abstraction Volumes in Cubic Metres (m3) (daily maximum). Information on water storage, land etc. (All from engineers)

ANNEX 2: CONSTRUCTION PROCEDURES

The Contractors and their sub-contractors shall employ the Construction Procedures listed below as a practical means to effect environmental mitigation while working on the project.

Annex 2.1 Procedures Site Clearance

Table A2.13 Procedure for Site Clearance

Procedure for Site Clearance	**CP01**	
	Rev: A	**Date: Nov 2010**
Purpose	To minimise the impacts of site clearance works on ecological habitats and wildlife in the area.	
Responsibility for control	Environmental Manager	
Procedures	Before any work is undertaken the proximity to water bodies and ecologically sensitive features shall be assessed. Whole trees shall be removed by trained operators using mulchers specifically designed for the purpose. As far as possible all woody vegetation shall be removed outside of the bird breeding season (March-August inclusive). Where this is not possible woody vegetation shall be checked prior to removal for active birds nests. If any are found works in that location shall cease until the nest can be confirmed as no longer active. Removal of top soil shall be undertaken in accordance with the soil stripping methods detailed in Procedure CP02. Removal of vegetation or top soil within 20m of a water course shall be carried out under the supervision of the Ecological Clerk of Works. If active birds nests, animal holes of sufficient size to be used by badger or otter, squirrel dreys, or individuals of bat, lizard or newt species are found during vegetation clearance then works in that location shall cease and ecologist advice sought. Removal of trees highlighted as potential bat roosts in the ES or in update surveys shall be undertaken using a 'soft felling' method as detailed in the ES. A licence from NIEA may be required if a roost is confirmed as present. Removal of confirmed bat roosts shall take place under NIEA licence and in accordance with the method detailed in the ES. As the confirmed roosts to be destroyed are summer roosts the licence would probably only be granted between October and February. Removal of vegetation or top soil within 50m of an otter holt or breeding site as highlighted in the ES or update surveys shall be carried out under licence from NIEA. Construction activities that are likely to damage or disturb an active badger sett as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. Closure of badger setts can only be undertaken between July and November Removal of ground flora or top soil within 250m of a newt pond as highlighted in the ES or update surveys shall be carried out in accordance with the specific newt habitat clearance guidance as detailed in the ES.	

Procedure for Site Clearance	CP01	
	Rev: A	Date: Nov 2010
	Removal of ground flora or top soil within or adjacent to a newt pond as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. This licence shall be required for the destruction of a newt pond and most probably only be granted between March and September. Removal of woody vegetation within 30m of an active squirrel drey as highlighted in the ES or update surveys shall be carried out following the methodology detailed in the ES and may require an NIEA licence. Removal of invasive species highlighted within the ES, update surveys or by site contractors shall be carried out under specific invasive species clearance methodology detailed in Environmental Consents (Annex 1.4 of the CEMP).	
Environmental Controls	All necessary, ecological licenses shall be in place prior site clearance start.	
Plant & Equipment	Excavator mounted and purpose built tracked mulchers. Excavator harvesters. Hand strimmers. Chainsaws. Tree climbing equipment.	
Monitoring	The Ecological Clerk of Works shall supervise vegetation removal in ecologically sensitive areas, all sites within 20m of water courses, all sites subject to a licence from NIEA, all vegetation cleared during bird breeding season and be on call during all vegetation clearance works.	
Emergency, preparedness and response	If active birds nests, animal holes of sufficient size to be used by badger or otter, bats or squirrel dreys are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted.	
References	Environmental Statement.	

Annex 2.2 Soil Strip

Table A2.2 Procedure for Soil Strip

Procedure for Soil Strip	CP02	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts on ecological habitats and wildlife in the area during soil stripping. To prevent damage to any archaeological remains discovered during construction. To enable the re-use of topsoil and the re-establishment of vegetation after work is complete.	
Responsibility for control	Environmental Manager	
Procedures	Prior to any topsoil being stripped, the topsoil shall be assessed for suitability for re-use on agricultural land, cut and fill slopes, planted landscape mitigation areas or on any areas of ecological interest. Method statements shall be prepared to identify the locations where the topsoil shall be stripped from, temporarily stockpiled and spread. Topsoil stripped from the area of excavations and the footprint of structural fill embankments shall be stockpiled in locations convenient for re-use once cut and fill slopes and landscape mitigation areas are ready for top soiling. Topsoil deemed suitable for re-use for agricultural regeneration or for shrub planting and other landscape mitigation shall be placed in stockpiles not exceeding 3 metres high. Stockpiles shall be allowed to vegetate to prevent erosion or weathering and shall be located away from drainage ditches. Finished worked slopes that are to be spread with topsoil shall be prepared as the earthworks progress and topsoil shall be spread as early as is practicable.	
Environmental Controls	Where required, Archaeological observers shall be present during the topsoil strip for a watching brief. Topsoil that has been identified as “ecologically interesting” shall be recorded as such within the method statement and shall be stockpiled for reuse in windrows no more than 1.5 metres high by 3 metres wide, shaped to shed water. Silt control measures shall consist of small bunds at the toe of the stockpiles as required. Spraying shall be carried out to prevent the proliferation of weeds.	
Plant & Equipment	Topsoil shall be removed and loaded by a 360° excavator using a toothless bucket to dump trucks for transport to stockpile. A 360° excavator shall handle and shape the topsoil at the stockpile site.	
Monitoring	Daily haulage record sheets used in productivity analysis shall provide a second reference to identify which topsoil is stripped from where and where it was placed.	
Emergency, preparedness and response	If animal holes of sufficient size to be used by badger or otter are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted. If items of potential archaeological value are uncovered then works in that location shall	

Procedure for Soil Strip	**CP02**	
	Rev: A	**Date: Nov 2010**
	cease and the Archaeologist shall be contacted.	
References	Environmental Statement.	

Annex 2.3 Earthworks and Drainage

Table A2.3 Procedures for Earthworks and Drainage

Procedure for Earthworks and Drainage	CP03	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts of earthworks on ecological habitats and wildlife in the area. To avoid pollution to water courses. To minimise nuisance to the local community due to deterioration of air quality and the creation of dust, noise and vibration. Minimise the surplus materials arising from earthworks.	
Responsibility for control	Environmental Manager	
Procedures	Landowners and authorities shall be informed in advance of commencement of filling at deposition areas. Bunting poles shall be erected around overhead services. Advance pre-earthworks, temporary drainage and dewatering shall be undertaken as required to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place before commencement of any works and appropriate treatment provided prior to discharge to watercourses. No water shall be allowed to pond on the formation layer. When unsuitable material is encountered this shall be removed in accordance with the Site Waste Management Plan. Method statements shall be prepared setting out procedures to monitor and control dust, noise, vibration and deposition on roads. Haul Roads shall be constructed to enable access to the works and movement of the earthworks through the site and to disposal areas. Temporary stockpiles of excavated earth shall be constructed within the lands made available. Stockpiles shall be shaped to ensure rainfall does not degrade the stored material. Drains shall be installed along the toe of embankments in fill areas. Embankments shall be constructed and graded to allow water to shed off the completed earthworks. Embankments shall be sealed at the end of each working shift to avoid ingress of water. The earthworks material shall be placed and compacted in layers to prevent water ingress and degradation of the material.	
Environmental Controls	Temporary drainage or dewatering shall be in place to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place and appropriate treatment provided prior to discharge to watercourses.	
Plant & Equipment	50t – 70t primary excavators 20t – 30t excavators	

Procedure for Earthworks and Drainage	CP03	
	Rev: A	Date: Nov 2010
	Rock breaking and processing equipment Bulldozers Graders 30t – 40t articulated dump trucks Compaction plant including various rollers Soil stabilisation plant	
Monitoring	Daily physical inspection of the site including; watercourses, haul roads, mechanical state of all plants, shall be undertaken to detect any signs of contamination or disturbance. A programme to monitor watercourses, air quality, dust, noise and vibration shall be in place during the construction phase.	
Emergency, preparedness and response	If animal holes of sufficient size to be used by badger or otter are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted. If items of potential archaeological value are uncovered then works in that location shall cease and the Archaeologist shall be contacted. An emergency plan shall be prepared to ensure that any unforeseen release of silty water or other polluted effluents are brought quickly under control and remediated in consultation with the NIEA.	
References	Environmental Statement.	

Annex 2.4 Bridge Construction

Table A2.4 Procedure for Bridge Construction Across the Rivers

Procedure for bridge construction across the rivers	**CP04**	
	Rev: A	**Date: Nov 2010**
Purpose	To minimise the impacts on ecological habitats and wildlife in the area during bridge construction. To minimise noise nuisance. To prevent environmental pollution incidents.	
Responsibility for control	Environmental Manager	
Procedures	**Installing temporary bridges** Bunds shall be constructed to surround the working platforms at a level to prevent floodwaters overtopping. Erosion protection shall be installed to the temporary bridge abutments and lead-in and lead-out edges of the bunds. The bridge shall be assembled in sections on a working platform. A crawler or all terrain mobile crane shall be used to lift the longitudinal truss sections over the river. Cross members between the trusses shall be infilled using a crane. To remove the bridge the reverse process to erection shall be employed. The deck shall be longitudinally sloping to give positive drainage of the deck surface. The water from rain or cleaning operations shall be channelled into the moat areas on the floodplain to be pumped to the discharge area. Solid face ply board panelling shall be installed to the sides of the deck to prevent any material that might fall from the trucks from falling into the river. It shall also stop splash water entering the river. Open flooring decking shall not be used. A maintenance regime for cleaning the deck of the bridge and cleaning the approach ramps to the bridge shall be in place. Regular dust suppression shall be required during dry periods to keep the surface of the haul road damp. **Piling for foundations** Any vibration shall be limited to those agreed with the local authorities. Spoil shall be removed by excavator to keep the work area clear and when necessary the excavator shall load the spoil to transportation for removal. Ground water within the bore displaced during placing of concrete shall be pumped away to a washout facility set up off the flood plain. Any spills of concrete shall be cleared up to avoid the possibility of cement contaminating water from rainfall or washing down of equipment. **Excavation for pier foundations** Prior to commencing the bulk excavation of the cofferdam one or more sump holes shall be excavated to the full depth of the excavation. The cofferdam shall be excavated using an excavator with a perforated bucket.	

Procedure for bridge construction across the rivers	CP04	
	Rev: A	Date: Nov 2010
	Low water table levels shall be maintained inside the cofferdam by pumping. Water from the pumping shall not be discharge back into any watercourse without appropriate attenuation and treatment. **Structure base construction** Prefabrication of formwork shall be undertaken remote from the floodplain and any debris from onsite fixing and fabrication shall be sent in skips for recycling. Dewatering of the cofferdam shall be maintained until the concrete base has been constructed, the piers are constructed to above ground level and the cofferdam has been backfilled. **Deck construction** The sub-deck shall have edge upstands, shall be watertight and shall drain to the moats either side of the river. The sub-deck shall provided a second line of protection to catch debris and liquids that would otherwise reach the river. It shall be designed to deflect objects away from the river to a place where they can be collected and disposed of. Until the permanent deck drainage is installed, measures shall be implemented to ensure run-off water from the deck is collected and piped to the moat area on the floodplain where it shall be pumped to discharge areas following suitable attenuation and treatment.	
Environmental Controls	Method statements shall be prepared for the control of noise and vibration. A 15 M.P.H. speed limit shall be imposed on the haul road across the floodplains and watercourses. This shall reduce the risk of dust contamination and pollution of the river. Equipment shall be selected to minimise noise and where appropriate with built in noise attenuation. Some construction materials will be subject to a COSHH assessment.	
Plant & Equipment	Crawler or all terrain mobile crane. Vibrating hammer/extractor. Breakers or crushing plant. Jack hammering. Crane pitching. Vibrating internal poker Concrete pumps. Vibrating rolling screed. Mechanical scabblers. Blacktop pavers and rollers.	
Monitoring	Drainage treatment areas used to accept dewatering and drainage water shall be subject to regular maintenance and monitoring.	
Emergency, preparedness	An emergency plan shall be prepared to ensure that any unforeseen release of silty water or other polluted effluents are brought under control and remediated in consultation	

Procedure for bridge construction across the rivers		**CP04**	
		Rev: A	**Date: Nov 2010**
and response	with the NIEA.		
References	Environmental Statement.		

Annex 2.5 Blasting

Table A2.5 Procedure for Blasting

Procedure for Blasting	CP05	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts on ecological habitats and wildlife in the area from blasting. To avoid pollution to water courses and land. To minimise nuisance to the local community cause by deterioration of air quality and the creation of dust, noise and vibration.	
Responsibility for control	Environmental Manager	
Procedures	An explosives supervisor shall be appointed. A site specific method statement and detailed risk assessment shall be produced prior to any blasting operations taking place. Notice shall be provided to the public informing them of the timing of planned blasts and providing the name, address and telephone number of a contact within the project team, who shall deal with their queries. Method statements shall be prepared to specify arrangements for the monitoring of noise and vibration. Site Rules shall be drawn up to govern shot-firing for rock extraction. These rules shall state how explosives are stored, transported, used and disposed of. Method Statements shall be prepared to specify arrangements for the safety of the workforce and the public. They shall also set down permitted shot-firing times, the determination of danger zones for vibration, warning systems, arrangements for disposal of surplus explosives and monitoring. The disposal of surplus explosives and packaging shall be carried out in strict accordance with the manufactures or suppliers instructions and guidelines. Where rock is excavated and stored temporarily, stockpiles shall be constructed within the lands made available. No water shall be allowed to pond on the rock surface. PSNI shall be fully involved in the approval and awareness of any activities associated with the use of explosives	
Environmental Controls	Design of blasting methodology to maximize efficiency and reduce the transmission of vibration including appropriate charging based upon site specific regression analysis.	
Plant & Equipment	Rotary drill rig Explosives delivery truck or explosives mixing truck Exploders Circuit Testers Wooden or anti-static plastic hand tools	

Procedure for Blasting	**CP05**	
	Rev: A	**Date: Nov 2010**
Monitoring	A programme to monitor watercourses, air quality, dust, noise and vibration shall be put in place during the construction phase. Continuous vibration meters shall be positioned at receptors adjacent to the site prior to shot-firing.	
Emergency, preparedness and response	The Site Manager shall ensure that emergencies response procedures are in place to cover situations involving injury, unforeseen damage to property and unaccountable loss of explosive materials. These procedures shall clearly identify responsibilities for liaison with Police, Fire and Ambulance forces.	
References	Environmental Statement.	

Annex 2.6 Demolition

Table A2.6 Procedure for Demolition

Procedure for Demolition	CP06	
	Rev: A	Date: Nov 2010
Purpose	To avoid pollution to water courses and land during demolition works. To minimise nuisance to the local community cause by deterioration of air quality and the creation of dust, noise and vibration.	
Responsibility for control	Environmental Manager	
Procedures	A site specific method statement and detailed risk assessment shall be produced prior to commencement of any demolition works. All underground pipes, tanks and services shall be located and marked. All tanks shall be labelled with their content and capacity. Visible signs of leaking tanks or pipes and any signs of contaminated ground or groundwater shall be checked. Recyclable waste arisings shall be segregated at source. Asbestos and other hazardous materials shall be separated for safe disposal. Licences shall be obtained from the local environmental health officer before any concrete, masonry or other material is crushed on site. Before removing or perforating tanks, all of their contents and residues shall be emptied for safe disposal by a competent operator in accordance with the Site Waste Management Plan. Pipes shall be capped or valves closed, to prevent spillage. Measures to avoid noise and vibration nuisance shall be agreed with the Local Planning Authority (LPA) and NIEA in advance. A method statement shall be prepared to specify how dust control measures (such as damping down) shall be implemented. All runoff from the site shall be controlled. Discharge licenses shall be in place and appropriate treatment provided prior to discharge to watercourses. Dust shall be prevented from escaping from materials in lorries leaving the site. If it is not possible to cover lorries because there are pieces of protruding material, they shall be sprayed with water just before they leave.	
Environmental Controls	Adequate inspection to plant and equipment in operation shall be carried out prior to demolition works to ensure that noise and vibration levels do not exceed those agreed with the local authorities. Suitable spill response materials and emergency instructions shall be available on site and staff shall have been adequately trained.	
Plant & Equipment	360^0 tracked excavator fitted with breaker Saw fitted with dust suppressant 40 Tonne tracked crawler crane / 80t mobile if necessary	

Procedure for Demolition		CP06	
		Rev: A	Date: Nov 2010
	Stihl saw Harness and appropriate Personal Protective Equipment (PPE) if necessary		
Monitoring	A programme to monitor air quality, dust, noise and vibration shall be put in place during the construction phase.		
Emergency, preparedness and response	Emergency response plans will be incorporated into the Contractors' method statements for each individual demolition operation.		
References	Environmental Statement.		

The Contractor shall develop these further as an integral part of their operational procedures for issue as Controlled Documents.

ANNEX 3: SITE ACCESS LOCATIONS

Table A3.1 Site Access Locations

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Section 1				
Junction 1 - Existing A5 (Victoria Road)	400	20 per day (240 days)	Directly off existing A5	
Junction 2 - Existing A5 (Victoria Road)	1770	20 per day (240 days)	New Junction 2 link road	
Shared Accommodation Access	2850	20 per day (300 days)	Shared access to treatment works	
Meenagh Road	4900	20 per day (360 days)	"Using existing side road (permanent stop off)"	
Existing A5	6400	20 per day (360 days)	Directly off existing A5	
Donagheady Road	7800	12 per day (240 days)	New Donagheady side road	
Existing A5	9100	20 per day (360 days)	Directly off existing A5	
Existing A5	11600	70 per day (360 days)	Directly off existing A5	
Junction 3	14700	160 per day (480 days)	New Junction 3 link road	Surplus from south of river Mourne & imported fill material.
Existing A5	16700 - 17900	90 per day (480 days)	Directly off existing A5	Surplus from south of river Mourne & imported fill material.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Junction 6 (Existing A5)	18050	50 per day (480 days)	Directly off existing A5	
Strahans Road	20500	200 per day(360 days)	"Using existing side road (improvements required)"	Surplus cut south of river Mourne hauled north via Strahans road.
Orchard Road	21500	15 per day (360 days)	Using existing Orchard road	
Junction 8 – Existing A5 (Melmount Road)	22090	10 per day (240 days)	New Junction 8 link road	
Peacock Road	22300	20 per day (360 days)	"Using existing side road (improvements required)"	
Section 2				
Primrose Park	27215	25 per day (240 days)	From Peacock Road/Ex. A5	Temporary Diversion to north side.
Bells Park Road (B165)	27995	20 per day (240 days)	From Ex. A5	Temporary Diversion to north side. Not required if new alignment is offline from existing.
Garden Road	28000			Assumed Closed until complete with Bells Park Rd.
High Road	28595			
Seein Road	29165	10 per day (120 days)	From Bells Park Rd.	Now offline. Shuttle work (traffic lights) to complete tie-ins.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Concess Road	30140			Short term Road Closures to construct road and beam lifts.
Fyfin Road (B72)	31445	50 per day (360 days)	From B165 & Ex. A5	Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth).
Stone Road	31910			Temporary closure with diversion using realigned Urbalreagh Rd.
Urbalreagh Road (North)	31985	20 per day (360 days)	From B72 Fyfin Rd.	
Urbalreagh Road (South)	31985		From B72 Fyfin Rd.	
Unnamed Road	32600			
Derg Road	33960	20 per day (240 days)	From Ex. A5 onto Old Bridge Rd.	Temp Diversion using existing to south of new realignment.
Deerpark Road (B164)	34725	20 per day (240 days)		Temp Diversion to the north of the new realignment.
Milltown Road	35305			
Magheracoltan Road	36285	20 per day (240 days)	From B164 and B84/Drumlegagh Rd.	Short term Road Closures to construct road and beam lifts.
Drumlegagh Road North	37130	20 per day (240 days)	From Magheracolton Rd to JN2 only.	
Golf Course Road	37280			

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Baronscourt Road (B84)	37290	50 per day (360 days)	From Old A5 Strabane Rd & Ex. A5.	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Oldcastle Road	38625			Temp Diversion to the north of the new realignment.
Honeywell Lane	39000			
New Glen to Old Glen Link	39350			
Glen Road	39305			Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Gortgranagh Road	39500			
Castletown Road (North)	39910	50 per day (360 days)	From Old A5 in Newtownstewart.	Maintain existing road until new overbridge complete.
Grange Road	40050			
West Road	41180			Temp Diversion to the north of the new realignment.
Joel's Lane	42610	25 per day (240 days)	From Ex. A5.	Maintain existing road until new overbridge complete.
Gordon's Lane	43700	50 per day (240 days)		Becomes a shared access track.
Killynure Road	44980			Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (South)	45688	20 per day (360 days)	From Ex. A5	Short term Road Closures to

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				construct road and beam lifts.
Cashty - Castletown link	45750			
Cashty Road	46900			
Dunteige Road	46970	20 per day (360 days)	From Castletown Rd at Mountjoy	Temp Diversion to the north of the new realignment.
Lisnagirr Road	47605	20 per day (480 days)	From Ex. A5.	
Tully Link Road East	48000			
Rash Road	48100	20 per day (240 days)	From Ex. A5.	
Tully Link Road West	48200			
Junction 11 – Drumlegagh Road South	49675	25 per day (360 days)	From Ex. A5.	Shuttle work (traffic lights) to complete tie-ins.
South Drumlegagh Road	49620	25 per day (360 days)	From Ex. A5.	
Todds Road	49890			
Mellon Park Drive	50495			
Armstrong's Lane	50770			
Gillygooly Road (B50)	51255	50 per day (360 days)	From Ex. A5.	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Mullaghmena Road	51255			Temporary Road Closure to construct & finalise to new B50.
Aghnamoyle Road	52145	20 per day (240 days)	From B50 Gillygooley Rd.	Use existing and realigned Botera Road as temporary

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				diversion until Overbridge complete.
Botera Road	52235			
Tamlaght Road	53205	10 per day (240 days)	From Brookmount Rd/ Ex. A5.	Full Road Closure for duration of bridge construction.
Brookmount Road	53825	10 per day (240 days)	From Ex. A5.	Short term Road Closures to construct road and beam lifts.
Juntion 12 - Clannobogan Road (A32)	54145	50 per day (360 days)	From A32	Short term Road Closures to construct road and beam lifts.
Loughmuck Road	54485	20 per day (120 days)	From Dromore Rd/A32	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Beagh Road	55485			
Ballynahatty Road	56530	20 per day (240 days)	From Old A5, Dublin Rd, Omagh	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Blackfort Road	57130	20 per day (120 days)	From Section 3/ B83 Seskinore Rd.	Use existing and realigned Blackfort Road as temporary diversion until Overbridge complete.
Drumragh Road	57300	20 per day (240 days)	From Section 3/ B83	

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
			Seskinore Rd.	
Section 3				
Junction 13 - Seskinore Road (B83)	62065	120 per day (540 days)	Use existing side road	Large quantities of export and import required.
Tattykeel Cottages North	62600	20 per day (360 days)	Use existing side road	
Tattykeel Cottages Central	62850	20 per day (360 days)	Acess directly from existing A5	Access to Doogary Bog
Tattykeel Cottages South	63800	20 per day (360 days)	Use existing side road	
Drumconnelly Road 1	64400	70 per day (450 days)	Use existing side road and realigned side road	Large quantities of export and import required.
Tullyrush Road	66000	35 per day (450 days)	Use existing side road with minor upgrade works	
Rarone Road	66900	25 per day (360 days)	Use existing side road with minor upgrade works	
Drumconnolly Road (South)	67900	25 per day (360 days)	Use existing side road with minor upgrade works	
Moylagh Road (B46)	68700	50 per day (450 days)	Use existing side road	Large quantities of export and import required.
Augher Point Road	68800	30 per day (360 days)	Use existing side road and realigned side road	
Greenmount Road	71150	65 per day (450 days)	Use existing side road	Large quantities of export and import required.
Springhill Road	73800	100 per day (720 days)	Use existing side road and temporary road	Large quantities of export and import required. No suitable alternative access between

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				Springhill and Glenhoy.
Tullanafoile Road	75900	10 per day (200 days)	Use existing side road	
Tullycorker Road	76600	10 per day (200 days)	Use existing side road	
Rarogan Road	78450	10 per day (200 days)	Use existing side road	
Glenhoy Road	80300	100 per day (720 days)	Use existing side road and realigned side road	Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy.
Ballynasaggart Road	81700	40 per day (720 days)	Use existing side road with minor upgrade works	Large quantities of export and import required.
Feddan Road	83300	10 per day (200 days)	Use existing side road	
Tullybryan Road	83400	20 per day (360 days)	Use existing side road and realigned side road	
A4 Annaghilla Road	83500	100 per day (720 days)	Use existing side road	Large quantities of export and import required.
Tullyvar Road (crosses A4)	N/A	20 per day (360 days)	Use existing side road	
Tullywinny Road (South)	84400	130 per day (540 days)	Use existing side road accessed from Ballynany Road	
Lisginny Road	86500	200 per day (540 days)	Use existing side road with minor upgrade works	Large quantities of export and import required.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Old Chapel Road	87800	10 per day (240 days)	Use existing side road	
Existing A5 - Tullyvar Road	88500	160 per day (720 days)	Use existing side road	Large quantities of export and import required.
Carnteel Road (B35)	90300	110 per day (360 days)	Use existing side road and realigned side road	Large quantities of export and import required.
Rehaghy Road (B128)	90800	50 per day (360 days)	Use existing side road and realigned side road	
Caledon Road (A28)	91900	60 per day (360 days)	Use existing side road	
Monaghan Road (stopped up, turning head provided)	93300	30 per day (360 days)	Use existing side road	Large quantities of export and import required.

ANNEX 4: TRAFFIC MANAGEMENT

Table A4.1 Traffic Management Description

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Section 1				
Junction 1 Existing A5 (Victoria Road(	400	No	Yes	One way TM (traffic lights) to complete tie-ins with the existing A5 and the junction changes associated with Woodside Road.
Junction 2 Existing A5 (Victoria Road)	1750	No	Yes	One way TM to complete tie-ins.
Junction 2 Link to A5WTC	1770	No	No	N/A
Dunnalong Road	3900	No	No	Local School bus route. Temporary diversion to the north of the existing road.
Meenagh Road	4900	Yes	Yes	No TM requirements. Landowner access will be maintained during works.
Existing A5 – Victoria Road	6400	No	Yes	Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and only requires the relocation of a bus lay-by to the north of the proposed structure. Night closure required for bridge beam lifts.
				New link road running across the top of the Bready cutting will require TM to complete tie-in.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Cloghboy Road	6400	No	No	Realigned Cloghboy Road constructed offline.
Tamnabrady Road (U1813)	7100	No	No	
Donagheady Road	7800	No	No	No TM requirements. Existing Donagheady Road maintained until new side road / structure completed. One way TM to complete tie-ins.
Willow Road	8900	Yes - in part	No	Realigned Willow Road constructed offline.
Existing A5	9100	No	Yes	Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and requires no upgrade works. Night closure required for bridge beam lifts.
Ash Avenue	9600	Yes	No	Establish Ash / Drumenny link prior to closing Ash Avenue.
Drumenny Road	10000	Yes	No	Traffic will use Ash Avenue during bridge construction works.
Ballydonaghy Road	10900	Yes	No	Temporary diversion to the north of the existing road.
Moss Road	11000	No	No	Traffic will use Ballydonaghy / Moss link during construction.
Greenlaw Road	12900	Yes	No	Establish Park Road / Greenlaw Road link prior to closing Greenlaw Road.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Park Road (north)	13500	No	No	Traffic flows will be maintained on existing Park Road during bridge construction works.
Junction 3 Existing A5 (Victoria Road)	14700	No	Yes	Various local temporary diversions for the realigned existing A5, Woodend Road and Park Road will be required during construction works. One way TM will be required at intervals during construction.
Spruce Road	15000	Yes	No	Early closure, access via. Park Road during construction.
Park Road (south)	17300	Yes (junction)	No	Existing junction with the A5 to be stopped up and diverted through the realigned link through Junction 4.
Greenbrae Park	17400	Yes	No	Road to be closed – no TM required
Lifford Road	17900	No	Yes	Various local temporary diversions will be required during construction works. One way TM may be required at intervals during construction.
Junction 5 Existing A5 (Barnhill Road and Bradley Way)	17680	No	Yes	New arm to be provided on the roundabout for the southbound slip road; TM will be required to complete the tie-in.
Junction 6	17900	No	No	New arm to be provided on the roundabout for the slip roads; TM will be required to complete the tie-in.
Urney Road (B85)	19500	No	No	Realigned offline. One way TM to complete tie-ins.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Carrick Avenue	19600	No	No	Realigned offline. One way TM to complete tie-ins.
Section 2				
Primrose Park	27215	No	Yes - from Sion Mills	Temporary diversion to north side.
				New alignment is offline from existing.
Garden Road	27900	Diverted	No	Assumed closed until complete with Bells Park Road.
B165 Bells Park Road	27995	No	Yes	
High Road	28595	Yes	No	
Seein Road	29165	No	Yes - from Bells Park Road	Offline. Shuttle work (traffic lights) to complete tie-ins.
Concess Road	30140	No	Yes - from Bells Park Road	Short term road closures to construct road and beam lifts.
Fyfin Road (B72)	31445	No	Yes	Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth).
Stone Road	31910	No	Yes	Temporary closure with diversion using realigned Urbalreagh Road.
Urbalreagh Road (North)	31985	Diverted	Yes	
Urbalreagh Road (South)	31985	Diverted	Yes	
Derg Road	33995	No	Yes - from Ex. A5	Temp diversion using existing to south of new realignment.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Deerpark Road (B164)	34725	No	Yes	Temp diversion to the north of the new realignment.
Milltown Road	35305	Yes	No	
Magheracoltan Road	36285	No	Yes	Short term road closures to construct road and beam lifts.
Drumlegagh Road North	37130	Diverted	Yes	Linked to Junction 10 connector road
Golf Course Road	37280	Yes	Yes	
Baronscourt Road (B84)	37290	No	Yes	Offline. Shuttle work (traffic lights) to complete tie-ins.
Oldcastle Road	38625	No	No	Temp diversion to the north of the new realignment.
Honeywell Lane	39000	Yes	No	
Glen Road	39305	Diverted	Yes	Shuttle work (traffic lights) to complete tie-ins.
Gortgranagh Road	39510	Diverted	No	Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (North)	40060	No	Yes	Maintain existing road until new overbridge complete.
Grange Road	40020	Diverted	No	
West Road	41180	No	No	Temporary diversion to the north of the new realignment
Joel's Lane	42610	Diverted	Yes	Maintain existing road until new overbridge complete.
Gordon's Lane	43700	Yes	Yes	Abandoned between Castletown Road and existing A5. Proposed underbridge (for landowner access) offline to the north.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Killynure Road	44980	No	Yes - from Ex. A5	Mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (South)	45688	No	Yes - from Ex. A5	Short term road closures to construct road and beam lifts.
Cashty	46900	Diverted	Yes	
Dunteige Road	46970	No	Yes	Temp diversion to the north of the new alignment.
Lisnagirr Road	47605	Yes	No	
Tully Road (North)	48100	Diverted	No	
Rash Road	48100	No	Y	Temp diversion via Tully Road (East).
Tully Road (South)	48495	Yes	No	
Drumlegagh Road South	49620	Yes	Yes	Link provided to Junction 11.
Junction 11 – Drumlegagh Road South	49675	-	Yes	Shuttle work (traffic lights) to complete tie-ins.
Todds Road	49890	Yes	No	
Mellon Park Drive	50495	Diverted	Yes	
Gillygooly Road (B50)	51255	No	Yes	Offline. Shuttle work (traffic lights) to complete tie-ins.
Mullaghmena Road	51255	No		Temporary road closure to construct and finalise tie-in to new B50.
Aghnamoyle Road	52145	No	Yes	Use existing and realigned Botera Road as temporary diversion until Overbridge complete.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Botera Road	52235	Diverted	No	
Tamlaght Road	53205	No	Yes	Full road closure for duration of bridge construction.
Brookmount Road	53825	No	Yes	Short term road closures to construct road and beam lifts.
Junction 12 - Clanabogan Road (A32)	54145	No	Yes	Short term road closures to construct road and beam lifts.
Loughmuck Road	54485	No	Yes	Offline to the north. Shuttle work (traffic lights) to complete tie-ins.
Beagh Road	55980	No	Yes	Mostly offline to the south. Partial temp diversion to the north.
Ballynahatty Road	56530	No	Yes	Mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Blackfort Road	57000	No	Yes	Use existing and realigned Drumragh Road as temporary diversion until overbridge complete.
Drumragh Road	57300	Diverted	No	
				Temporary diversion to north side.
				New alignment is offline from existing.
				Assumed closed until complete with Bells Park Road.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Section 3				
Junction 13 - Seskinore Road (B83)	62065	Re-aligned	Yes	Temporary road construction for tie-in. Possibly traffic lights for Western tie-in through bog.
Existing A5 - Doogary Road	62100	Re-aligned	Yes	Temporary road construction for tie-ins.
Tattykeel cottages north	62600	Yes	Yes	Road closure agreed, access provided from south.
Tattykeel cottages central	62850	Re-aligned	Yes	Road closure agreed, access provided from south.
Tattykeel cottages south	63800	Yes	Yes	Remains open until central section re-opens.
Drumconnelly Road (North)	64400	Re-aligned	Yes	Short duration closure required to construct tie-in.
Tullyrush Road	66000	No	Yes	Road closure agreed for duration of structure. Diversion via Seskinore Road.
Rarone Road	66900	No	Yes	Road closure agreed for duration of structure. Diversion via Seskinore Road.
Drumconnolly Road (South)	67900	Yes	Yes	Remains open until Rarone Road re-opened.
Moylagh Road (B46)	68700	Re-aligned	Yes	Temporary road required for tie-in.
Augher Point Road	68800	Re-aligned	Yes	Temporary road required for tie-in.
Killadroy Road	70950	Re-aligned	No	Short duration closure required to construct tie-in.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Greenmount Road	71150	Re-aligned	Yes	Short duration closure required for tie-ins, beam lifts access via Kiladroy.
Routingburn Road	72000	Yes	No	
Springhill Road	73800	No	Yes	Temporary road constructed to south.
Cormore Road	75000	Yes	No	
Tullanafoile Road	75850	No	Yes	Road closure agreed. Phased with Tullycorker.
Tullycorker Road	76650	No	Y	Road closure agreed. Phased with Tullanafoile.
Tycanny Road	78200	Re-aligned	N	Short duration road closure required for tie-in.
Rarogan Road	78450	No	Y	Road closure agreed. Phased with Tullycorker.
Glenhoy Road	80200	No	Y	Short duration road closure required for tie-in.
Ballynasaggart Road	81700	No	Y	Road closure agreed. Phased with Crew Road.
Crew Road	82000	Yes	N	Remains open until Ballynasaggart re-opens.
Feddan Road	100 (on A4)	No	Y	Road closure required. Alternative access via Ballynasaggart Road.
Tullybryan Road	450 (on A4)	No	Y	Online construction. Road closure required.
Junction 15 – Existing A4 Annaghilla Road	83500	No	Y	Online construction. Temporary traffic restrictions (dual to single).
Tullyvar Road (crosses A4)	N/A	No	Y	Temporary road required for construction of embankments.
Ballynany Road	83700	Yes	Y	Road closure required. Phased with Tullywinny.
Tullywinny Road (Tie-In with A4)	N/A	Yes	N	Road closure required.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Tullywinny Road (South)	84400	No	Y	Road closure required. Phased with Ballynany.
Lisginny Road	86500	No	Y	Short duration closure agreed for construction of tie-ins.
Old Chapel Road	87800	No	Y	Road closure required for duration of structure.
Existing A5 - Tullyvar Road	88400	No	Y	Temporary roads required for construction of tie-ins.
Loughans Road	88500	No	N	Road closure required for duration of structure.
Carnteel Road (B35)	90300	No	Y	Temporary roads required for construction of tie-ins.
Rehaghy Road (B128)	90800	No	Y	Short duration closures required for beam lifts, road closures.
Caledon Road (A28)	91900	No	Y	Temporary road required for construction of tie-ins.
Existing A5 - Monaghan Road	93000	Yes	Y	Possibly traffic lights/ temporary road for construction of tie-in.

Appendix 6: Draft Silt Management Plan

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A5 Western Transport Corridor

Draft Silt Management Plan (SMP)

November 2017

Produced for

Department for Infrastructure

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CONTENTS

1. Introduction

1.1.1. This plan sets out site controls for management of sediment generated from over pumping during the construction of the new culverts and precipitation runoff during earthwork operations.

1.1.2. All relevant construction activities for temporary and permanent works will follow relevant environmental legislation in consultation with Northern Ireland Environment Agency (NIEA) and where required, DfI Rivers, Loughs Agency and DAERA, Inland Fisheries. The main objective of the Silt Management Plan is to ensure that all drainage of temporary works is carried out in adherence with current regulation and to provide guidance on how to prevent water pollution.

1.1.3. Various agencies are responsible for control of distinct elements of the works:

- DfI Rivers – proposals do not cause flooding upstream of the works.
- NIEA – discharge of precipitation water, extraction and ecological licenses.
- Loughs Agency – fish within the Foyle Catchment.
- Inland Fisheries – fish within the Blackwater Catchment.

1.1.4. The construction phase of all projects is a period within which there is a significant potential for pollution, in particular silt pollution to local watercourses due to unearthed alluvium. The objective of this plan is to provide guidance on the relevant statutory provisions, including any consents required, in respect of the water environment, to protect both physical habitat and morphology and to avoid unacceptable adverse impacts including changes to flow volume, water levels and water quality due to construction.

1.1.5. This plan aims to address the requirements of the DfI Rivers, NIEA, Loughs Agency and Inland Fisheries and detail the strategy for dealing with these key environmental risks.

1.1.6. A Discharge License will be required from NIEA to enable the works to commence. This licence will be granted for each phase of the works and the works will then be monitored on a month by month basis by the NIEA. Each month contractors will be required to issue a monthly return to the NIEA which will be the projected discharges for the following month. These will be linked to the construction programmes. These plans will be reviewed every three months and updated if required.

1.1.7. Where construction activities near water courses and water bodies are essential, steps have been undertaken to identify sufficient mitigation measures for the protection of the watercourses against pollution. The Silt Management Plan also includes details for

pollution prevention measures and construction methodologies to be incorporated during the construction phase of the project.

1.1.8. Caution is required to prevent pollution and/or environmental damage, particularly when the following activities are undertaken:

- Construction of permanent and temporary bridges.
- Discharges into a surface water drainage system.
- Operating plant or machinery in, or in the vicinity of water.
- Discharges of surface water runoff.
- Laying of pipeline or cable.

2. Silt Management

2.1. Scheme Overview

2.1.1. The proposed A5WTC would be an 85km long dual carriageway, running between New Buildings and the border with the Republic of Ireland (ROI), immediately south of Aughnacloy.

2.1.2. The proposed scheme runs along the Foyle Valley, close to the River Foyle, crossing the Burn Dennet

2.1.3. A full description of the scheme alignment is presented in Appendix A.

2.1.4. The works consist of a number of watercourse crossings which require the construction of new piped or box culverts to carry the streams under the new mainline. An example detailed method statement has been developed to control the construction of these and is included in Appendix B.

2.2. Sensitive Areas

2.2.1. The following areas are considered to be particularly sensitive with respect to potential impacts from pollution which may result from inadequate drainage control:

The River Foyle has a catchment area of approximately 2890km^2 and extends into the counties of Londonderry, Tyrone and Donegal. The major tributaries of the Foyle include the Burn Dennet, Glenmornan, Finn, Mourne, Strule, Owenkillew, Derg, Fairy Water, Camowen and Drumragh Rivers. The northern section of the proposed route lies within the Lower Foyle Catchment, where the Mourne and the Finn converge at Strabane to form the River Foyle. From Strabane the Foyle flows north to Londonderry and Lough Foyle. The lough is tidal and exerts a tidal influence up the River Foyle as far as Strabane. The tidal reach of the Foyle has a tidal range of approximately 3m and is up to 750m wide in places. The main tributaries to the Foyle in the vicinity of the route are discussed in the following paragraphs. However, there are also a significant number of smaller tributaries which the route crosses. These tributaries are generally large man-made field drains and small streams which have been heavily modified / straightened where they pass through villages and agricultural land. The proposed scheme runs along the eastern side of the River Foyle from New Buildings to Strabane, primarily through agricultural land.

The Burn Dennet has a catchment of approximately 150km^2. It rises in the Sperrin Mountains, and flows 35km west to the River Foyle. The catchment is predominantly agricultural, although there are significant sand and gravel quarries close to its lower reaches. The Proposed Scheme crosses the river in the vicinity of Burn Dennet Bridge. Here, the watercourse is approximately 15m wide and typically transitional in character, the valley being relatively unconfined with a wide floodplain and a channel which is relatively

shallow in gradient and meandering in form with riffle/pool sequences.

The Glenmornan River has a catchment of approximately 35km^2. It rises in the foothills of the Sperrins and flows 16km west to the River Foyle passing through the villages of Artigarvan and Ballymagorry. The upper catchment comprises peat covered hills. The landscape of the mid and lower reaches is predominantly agricultural. There are some sand and gravel workings adjacent to the middle reaches of the watercourse. Where the Proposed Scheme crosses the river, north- west of Ballymagorry, the river channel is between 4m and 20m wide and typically transitional in character.

The River Finn rises in Lough Finn in County Donegal and flows east for 60km to Strabane, where it joins with the River Mourne. The upper reaches of the catchment, which has an area of 495km^2, generally flow through mountainous terrain. The route runs along the eastern bank of the lower reaches of the river, which by this point is a mature lowland river, with a wide unconfined valley and floodplain that is relatively deep and slow flowing.

The River Mourne forms the middle section of the main spine of the Foyle Catchment and has a catchment area of 1860km^2. The Mourne is formed at the confluence of the River Strule and River Derg near Ardstraw. The river flows north to Strabane, where it merges with the River Finn to form the River Foyle. The route runs parallel with the western bank of the Mourne. The Mourne is a transitional river with numerous riffle and pool sequences, which flow in a relatively unconfined valley within a large floodplain. The river channel is on average 60m wide and has been heavily modified at Sion Mills, where historically a large weir has been constructed. As the Mourne passes through Strabane the river channel has been modified by various flood defences.

The River Derg rises in the Killeter Uplands to the west of the route and flows eastwards to its confluence with the Strule River near Ardstraw. The route crosses the lower reaches of the Derg close to the confluence. The upper reaches of the catchment, which is approximately 440km^2, are characterised by peatlands, while the lower reaches flow predominantly through farmland. The main stream length of the River Derg is 53km. Within the vicinity of the Proposed Scheme the River Derg is a transitional (piedmont) river characterised by a well-developed valley, reasonably large floodplain and variable substrate with riffle and pool sequences.

The River Strule forms the upper section of the main spine of the Foyle Catchment, and has a catchment area of 1340km^2. The Strule is formed by the confluence of the Camowen and Drumragh rivers in the centre of Omagh. The Strule then flows northwards for approximately 21km before merging with the River Derg to form the Mourne. The entire length of the Strule runs parallel to the route. The Strule has two major tributaries, the Owenkillew which joins the Strule from the east at Newtownstewart and the Fairy Water which joins to the north of Omagh. As the proposed route passes to the west of Newtownstewart the Owenkillew is unlikely to be affected by the proposed road scheme. The route does cross numerous small stream tributaries on the western slopes of the Strule valley. The Strule is a transitional river with variable bed materials, riffle and pool

sequences, an unconfined valley and floodplain. The catchment is predominantly agricultural, although peat bog is present in the upper reaches of the large tributaries and sand and gravel quarrying is present in the Strule valley, particularly north of Newtownstewart.

The Fairy Water rises on the slopes of Bolaght Mountain in west Tyrone and flows eastwards to its confluence with the River Strule to the north of Omagh. It has a catchment area of 180km^2 and a main stream length of 30km. The catchment is predominantly agricultural grassland; however there are significant areas of peat throughout the catchment, particularly in the valley floor. The Proposed Scheme crosses the Fairy Water approximately 500m upstream of its confluence with the Strule. In this area the river is approximately 16m wide and has typical transitional characteristics with a meandering channel pattern and riffle and pool sequences.

The Drumragh River lies in the upper reaches of the Foyle Catchment and is formed to the south of Omagh by the confluence of the Ballynahatty Water and Quiggery Water. It has a catchment area of 321km^2. The Drumragh flows generally north through the centre of Omagh before merging with the Camowen to become the River Strule. The route crosses the Drumragh approximately 2.5km downstream of the Ballynahatty-Quiggery confluence. At this point the river is approximately 10-15m wide and has typical transitional characteristics with variable bed material, riffle and pool sequences and an unconfined valley and floodplain. Due to the nature of the topography in the Drumragh catchment there is an intricate dendritic drainage network, with a large number of tributary streams. The route skirts around the eastern extent of the upper Drumragh catchment, crossing a number of small streams / large field drains within the Routing Burn and Eskragh Water sub-catchments. Many of the streams have been straightened or otherwise modified, with the exception of the Routing Burn main stream length, which is largely unmodified.

The Camowen River rises in the hills to the west of Pomeroy and flows westwards to Omagh, where it joins with the Drumragh to form the River Strule. It has a catchment area of 276km^2. The Proposed Scheme passes through the western extent of the Camowen watershed, crossing the headwaters of a minor tributary to the Camowen River, namely the Ranelly Drain. These headwaters generally rise in the low lying peatlands which have formed between the drumlins that characterise the area. The reaches that the route pass over range from small semi-natural streams a few metres wide with good flow to very narrow ditches with limited flow.

The River Blackwater rises to the west of Fivemiletown and flows eastwards to Aughnacloy then north-east to Lough Neagh. It has a catchment area of 1493km^2. The Proposed Scheme crosses the eastern part of the Upper Blackwater catchment, passing through the major tributary sub-catchments of the Roughan Burn and Ballygawley River, before terminating on the northern bank of the River Blackwater immediately south of Aughnacloy.

The Roughan Burn rises on the southern slopes of Slievemore and flows south through Ballymackilroy before joining the River Blackwater downstream of Augher. It has a

catchment of 27.02km^2. Where the Proposed Route is crossed by the Roughan Burn it is a small, shallow stream with gravel and cobble bed. Although this reach is generally unmodified the lower reaches have been extensively straightened.

The Ballygawley Water rises on the slopes of Eshmore Hill approximately 12.5km northeast of Ballygawley. It has a catchment of 53.25km^2. The river flows through the town before joining the river Blackwater at Lismore Bridge, approximately 6km downstream. The Proposed Scheme crosses the Ballygawley Water approximately 2km downstream of the town. At this point the river is approximately 10m wide with a shallow cobble and gravel bed.

2.3. Environmental obligations of the project during construction phase

2.3.1. The surface water management plan and pollution prevention measures installed as part of the A5WTC will be constructed using best practice and in conformance with the requirements of NIEA and other relevant governing bodies. The key legislation and guidance which will be adhered to are as follows:

- Water Framework Directive (Directive 2000/60/EC)
- Water (Northern Ireland) Order 1999
- Water abstraction and impoundment regulations (licensing) Northern Ireland 2006
- Groundwater regulations (Northern Ireland) 2009 (as amended)
- Control of pollution (oil storage) regulations (Northern Ireland) 2010
- Drainage (Northern Ireland) Order 1973 (as amended)
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009
- Pollution Prevention Guidance Notes (PPGs):
    - PPG01 General guide to the prevention of water pollution
    - PPG02 Above ground oil storage tanks
    - PPG05 Works in near or liable to affect watercourses
    - PPG06 Working at construction and demolition sites

  - PPG07 Refuelling Facilities
  - PPG11 Preventing pollution at industrial sites
  - PPG18 Control of spillages and firefighting runoff
  - PPG20 Dewatering underground ducts and chambers
  - PPG21 Pollution Incident Response Planning
  - PPG23 Maintenance of Structures over Water
  - PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers

- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Pollution from Linear Construction Project. Technical Guidance
- CIRIA Handbook C651 Environmental good practice on site checklist
- CIRIA Report C697 - The SUDS Manual
- CIRIA Report C741 Environmental Good Practice on Site Guide (Fourth Edition)

2.4. Silt Management

2.4.1. Contamination by silt from site runoff into adjoining water courses is a key risk for this project if not properly controlled throughout the construction of the Scheme.

2.4.2. Site discharge licences will be required from NIEA prior to works commencing. Any application for such consent must clearly state how site runoff with be managed, treated and returned to the watercourse.

2.4.3. Site runoff is made up of two components and are the direct results of heavy rain.

2.4.4. The first component is runoff from adjoining land that is not affected by the works. Runoff from adjoining land would be intercepted by the early construction of pre-earthwork drained ditches (PED). This will be one of the first earthwork operations. Where the new road is in a cutting then the PED would be located at the top of the cut. Any water entering this ditch would be runoff from adjoining land thus would not need treating.

2.4.5. The second component is runoff across the works once the topsoil strip has been completed, this could be any of the following:

- Runoff across topsoil strip
- Runoff down cutting slopes
- Runoff down embankments being constructed.

2.5. General Construction Policies

2.5.1. The Silt Management Plan has been developed to minimise and mitigate for the effects of pollution to all local watercourses. However, this does not remove environmental responsibilities from the contractor / sub-contractors. All site personnel should be made aware of their environmental responsibilities through the production of this Construction Method Statement and an environmental induction.

2.5.2. In accordance with BS6031: 2009 Code of Practice for Earthworks, land disturbance will be kept to minimum and disturbed areas will be stabilised as soon as possible. Soil handling will be undertaken with reference to best practice guidelines.

2.5.3. In general the following will be adhered to in terms of the general Earthworks:

- All roads will be kept free from dust and mud deposits.
- Areas of extraction and deposition will be carried out according to BS6031:2009 Code of Practice for Earthworks. Risk assessment will be evaluated to ensure all surface water will be appropriately treated prior to entering a discharge point.
- Any clean surface water not directly linked to a watercourse will be dealt with in the

appropriate manner and field drainage introduced to the nearest stream before work begins.

- Retention ponds will be dug out first. These retention ponds will form part of the permanent SUDS and will be used during the construction period to deal with any surface water and act as sedimentation control.
- Trapezoidal-ditches will be dug out where required to channel any surface water from haul roads into these retention ponds. These will be to minimal gradient and if required straw bales or clean stone will be installed to act as weirs.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works; surface water runoff may also be diverted around the excavations using heavy timbers or similar laid on the surface of the ground.

2.6. Installation Programme

2.6.1. At all times silt management features should be constructed prior to, or at the same time as the construction of the works. Before runoff is allowed to flow through the ditches, or across embankments scrutiny must be given by the contractor that the ditches, ponds slopes and embankments are fully stabilised and will not be affected by erosion. This will prevent the clogging of other parts of the system by the silt that is generated.

2.7. Working in the vicinity of water / Buffer zones

2.7.1. The following recommendations apply to the general construction activities either within the watercourses or in the vicinity of watercourses:

- Where practicable construction near streams should be avoided in wet weather.
- Keep cement and concrete out of watercourses.
- Plan so that roadside drains do not discharge directly into watercourses, but rather through a vegetated buffer area of adequate width.
- Runoff from excavations will NOT be pumped directly to watercourses.
- Should there be any incidents of pollution to the watercourses NIEA will be notified immediately. Immediate steps will be undertaken to resolve the cause of the pollution and where feasible mitigate against the impact of pollution, following the advice set out in PPG21.

2.8. Temporary Haul Roads

2.8.1. It is proposed that as the scheme progresses, the finished permanent roads will act as the temporary haul roads during the construction phase.

- Construction activities will be scheduled to minimise the area and period of time that soil will be exposed, particularly during winter periods.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works.

- Stockpiling of materials will be minimized and essential stockpiles will be located as far away as possible from watercourses.
- Drains and culverts will be kept clear of debris and silt traps will be maintained appropriately. Spoil will not be dumped within buffer areas.
- Erosion of embankments will be avoided and, where possible, a vegetation cover will be maintained.
- Roads, drains and silt traps will be inspected for damage after intense storms and also before and after any intensive use.
- Site roads and approaches to river crossings will be regularly brushed or scraped and kept free from dust and mud deposits. Stone hardstandings will be introduced prior to road crossings.

2.9. Settlement Ponds

2.9.1. Where possible, permanent SUDS pond locations will be used during the temporary construction phase to collect silt. At completion of the construction phase the settlement ponds will be fully reinstated to final design requirements.

2.9.2. Site runoff will be intercepted by PED and the ditches will feed into temporary balancing ponds. Straw bales will be placed along the length of the ditch to help early removal of silt.

2.9.3. The ponds will be a minimum of 20m x 10m x 3m deep so that the pond can store approximately 500m^3. The maximum precipitation on a 1 in 75 year rainfall has been used in the storage calculations. An example of the calculations is attached in Appendix C.

2.9.4. The strategy is to collect the silt contaminated runoff at the temporary pond locations, allow the silt to settle and gravity feed the pond water back into the watercourse.

2.9.5. The outlet will be set at a higher level in relation to the inlet so that the pond fills up and allows the silt to settle.

2.9.6. Construction waste materials such as generated silts will be disposed of in such a manner that it does not add risk of additional silt load in the construction runoff.

2.9.7. Settlement ponds will be inspected for damage after intense storms in particular at the entry point and around the forebay area.

2.9.8. In most instances the works will only be affected by normal rain showers and thus operations would stop. Following heavier rainfall events the trace will be allowed to dry before recommencing earthworks operations.

2.10. Exposed Ground and stockpiles

2.10.1. As part of the surface water management plan for the site the following measures have been incorporated for spoil management areas.

- The amount of exposed ground and soil stockpiles will be kept to a minimum.
- Stockpile which will be in place for an extended period of time will be allowed to re-vegetate naturally.
- Short term stock piles will be sealed.
- Cut-off trenches will be installed uphill of spoil management areas to divert flows away from potential sources of silt pollution.
- Silt fences made from a suitable geotextile material will be used alongside all exposed ground where there is a pollution risk. Areas on a steep gradient will be managed to make sure erosion does not take place and small ditches will be considered around the perimeter.

2.11. Excavations

2.11.1. Every effort will be made to prevent water from entering excavations. Cut off ditches will be used to prevent entry of surface water. Clean runoff within the cut off trenches will be discharged back into the natural drainage system.

2.12. Over Pumping

2.12.1. Over pumping will be avoided for construction of culverts within this scheme wherever possible.

2.12.2. Where over pumping is essential, no direct discharge to the existing watercourse will be permitted. Water from the over pumping operation will pass through a stilling pond and a settlement pond before being discharged to the receiving watercourse.

2.12.3. Any over pumping that may be required for other works such as below ground excavations will be strictly controlled by the on-site Environmental Manager using a 'permit to pump' system and regular monitoring of compliance with control measures.

2.12.4. All pumping operations will ensure that the pumps are sited a minimum of 15m away from the water course, drip trays or lined bunds are used to avoid accidental spillage. Spill kits will be located at the pump locations.

2.12.5. All over pumping would be undertaken using the one of the methods outlined below:

- Water pumped into a silt tank will allow any silt to settle before being gravity fed back into the watercourse downstream of the works back into an approved discharge location.
- Water pumped into the PED which incorporate mitigation measures such as check dams and silt traps which would make its way to a settlement lagoon allowing sediment to settle before water is discharged back into an approved discharge location.

2.12.6. If heavy rain was encountered which could result in flood upstream of the works then over pumping and construction operations will be stopped and the works will be allowed to re-fill with water.

2.13. Plant Crossings

2.13.1. In Salmonid catchments, all in stream works will be carried out during the months of May to September inclusive.

2.13.2. In Brook/Sea Lamprey catchments, all in stream works will be carried out during the months of September to March inclusive. It is intended that culverts that are piped in the permanent solution will be piped using the permanent diameter pipe size as a temporary crossing during this 5-7 month timeframe.

2.13.3. Crossing that are required outside of the windows listed above will require a temporary bridge crossing which will span the top bank of the existing watercourse. Precast concrete abutments will be used in order to mitigate the risk of contamination of the watercourse using concrete. The bridge will use steel beams to span the watercourse and precast concrete planks. Details are contained within Appendix D.

2.14. Sampling

2.14.1. A programme of water monitoring will be carried out during the construction phase.

2.14.2. The extent and frequency of the monitoring will be proportionate to the level of activity. Such monitoring will be required in order to:

- Demonstrate that the mitigation measures and surface water management plan is performing as designed;
- Provide reassurance that the in-place mitigation measures are not having a significant impact upon the environment;
- Indicate whether further investigation is required and, where any risks are unacceptable, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

2.14.3. This monitoring will commence prior to the start of work activities to establish the baseline conditions at each work site.

2.14.4. The surface water monitoring programme will be site-specific and tailored to provide a meaningful and pragmatic indication of the state of the water environment. Given the nature of the development, it is considered that the surface water monitoring programme will comprise:

- An initial site walkover to establish base line conditions and identify watercourses which are presently polluted from silt deposition or any other waterborne pollutants.
- Regular visual inspections of surface water management features, such as culverts and receiving watercourses, in order to establish whether there is increased erosion or deposition and sediment.
- Regular visual inspections of watercourses during construction and decommissioning stages, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities.
- Periodic and ad-hoc sampling of surface waters and private water supplies in order to complement the programme of visual inspection.

2.14.5. Additional monitoring required as a condition of discharge consents, abstraction licences or other environmental regulation.

2.14.6. All subsequent monitoring results will be compared with the baseline data-set to identify any impacts of the development on the surface water environment and to identify the requirement for any appropriate remedial measures. The impacts of the development will be deemed acceptable if there is no significant net deviation from the baseline monitoring results.

3. Flood Defences

3.1.1. For works that affect any existing flood defences a secondary defence will be constructed prior to the removal of the existing defence.

3.1.2. No works will be allowed to take place that affects flood defences without prior approval from DfI Rivers and NIEA.

4. Monthly Reporting

4.1.1. NIEA, DfI Rivers and Loughs Agency are all key stakeholders on this project and will be part of the monthly stakeholder meetings. These meetings will review the last months work, discuss the following month's works and discuss lessons learnt. As part of this forum contractors will submit their monthly work schedule, two monthly rolling programme which clearly show the works areas for the following month and their anticipated discharge rates. These will be based on the works area affected and the potential of a 1 in 75 year storm event happening.

Appendices

Appendix A – Scheme Alignment

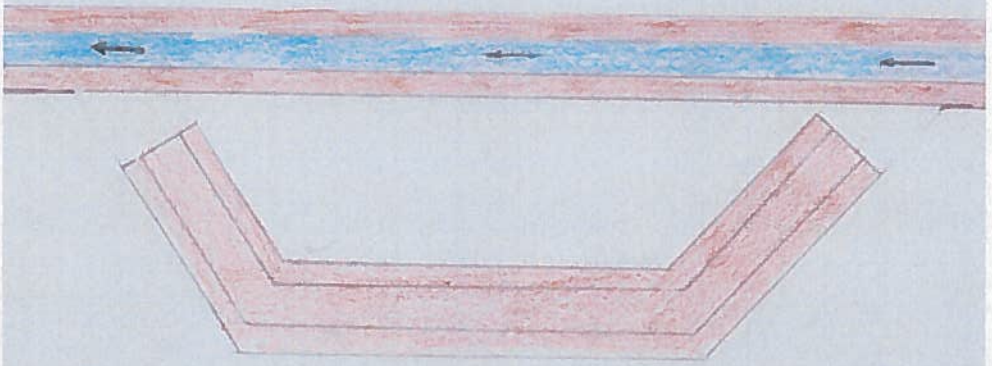
See Main Report Appendix 1 Sheets 1 to 24.

Appendix B – Example Watercourse Crossing Construction Method Statement

1/

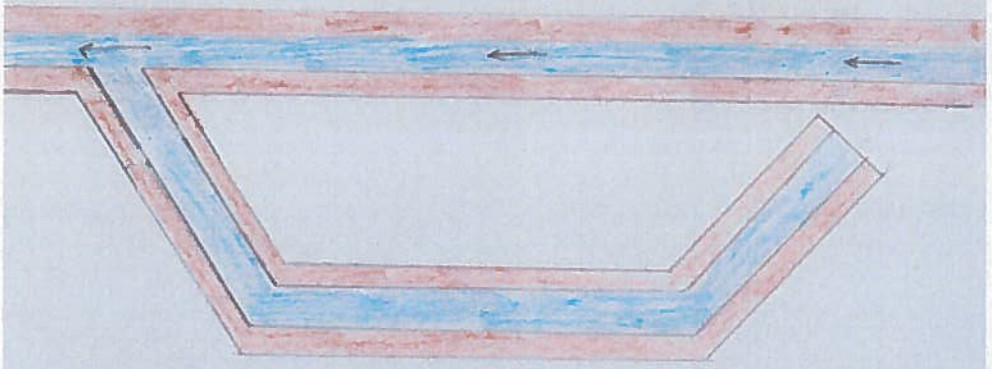
Existing Watercourse

2/



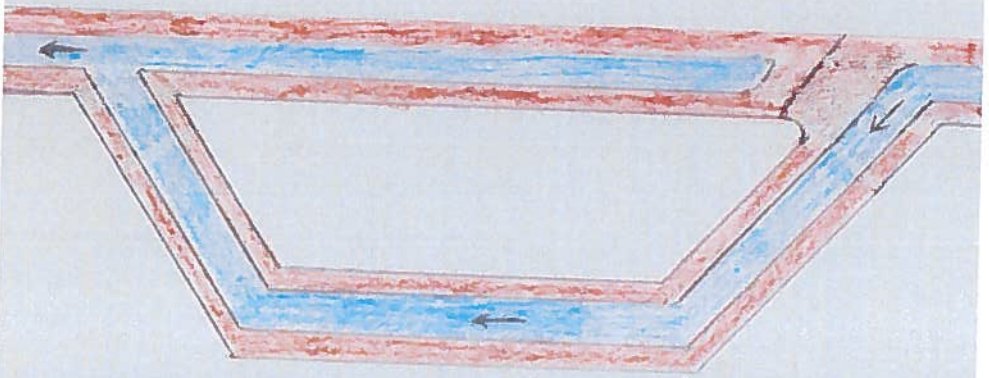
Excavate Watercourse diversion to within 2m of existing watercourse

3/



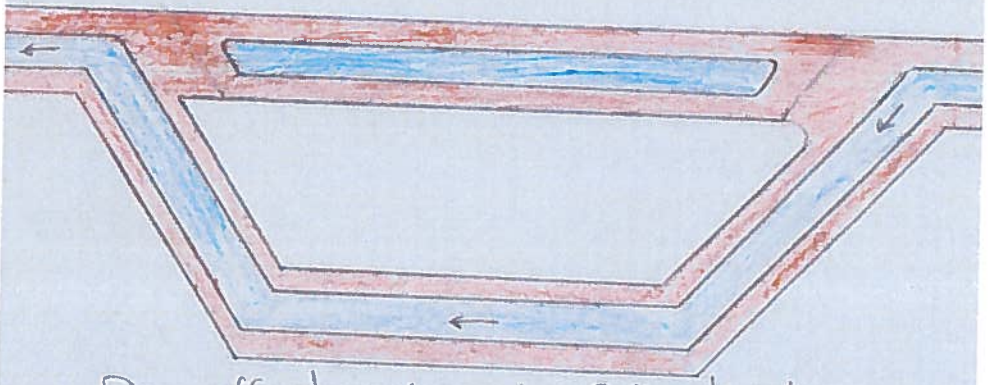
Excavate downstream plug - place silt fence/straw bales downstream to catch any contamination

4/



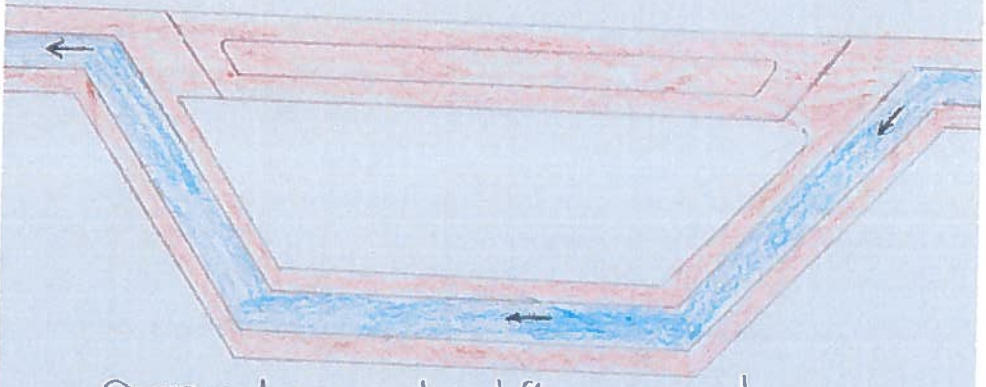
Excavate upstream plug and dam existing watercourse to divert water down new diversion

5/



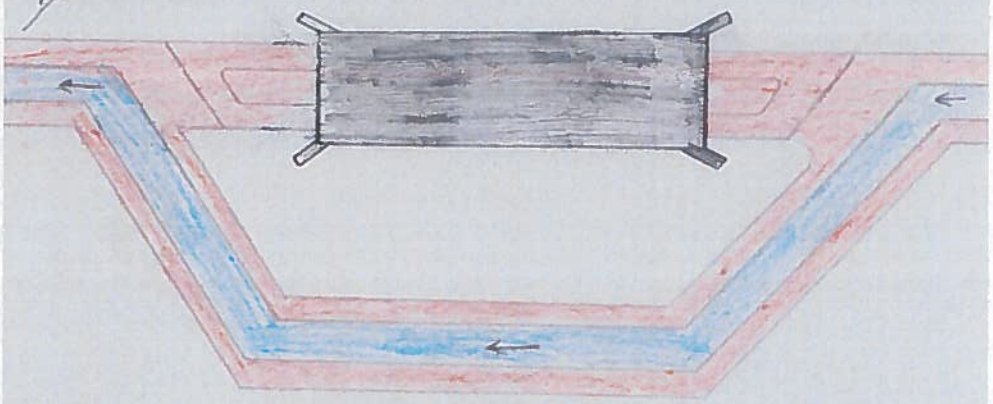
Dam off downstream to fully divert stream
Carry out electrofishing and transfer any fish to new diversion

6/



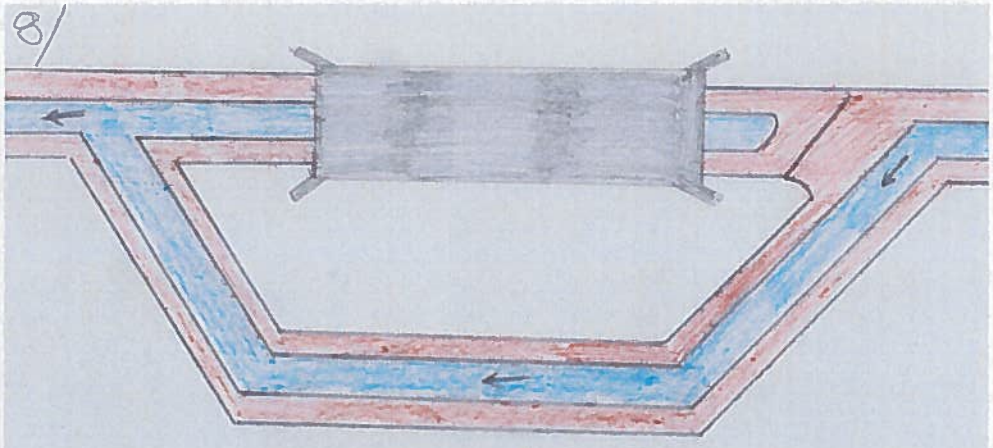
Pump out any water left in original water course

7/



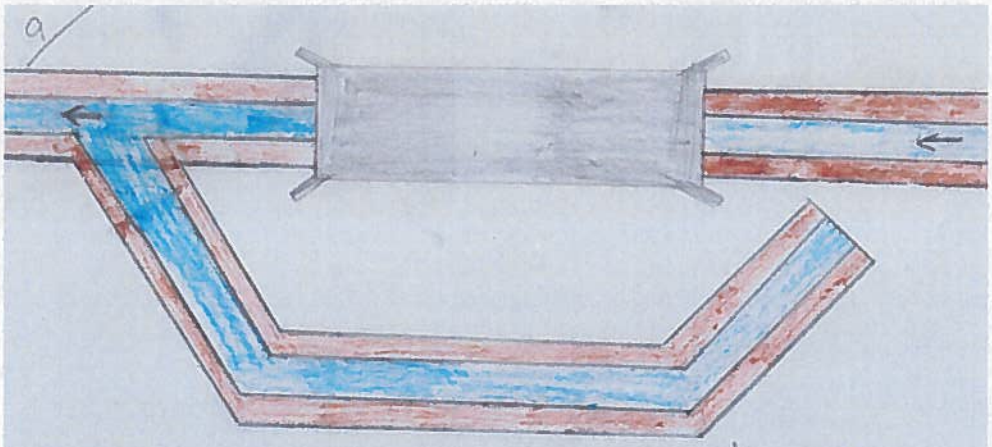
Construct new culvert

8/



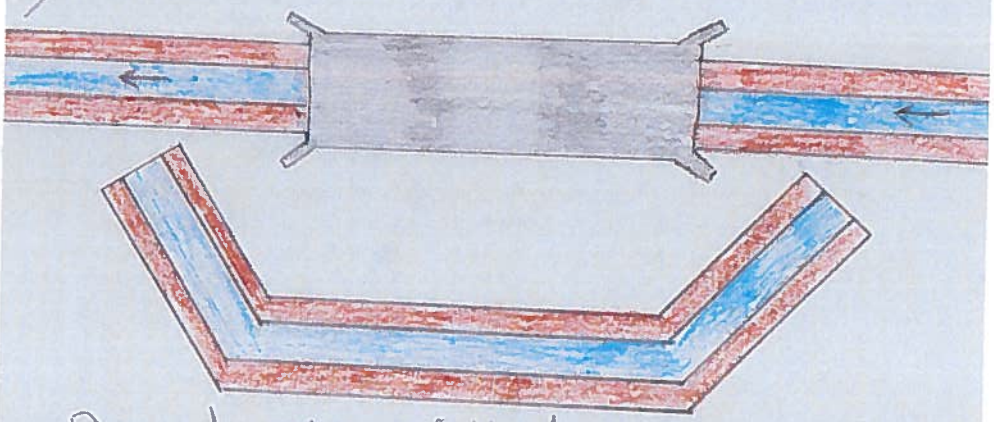
Remove downstream dam from Original water course

9/



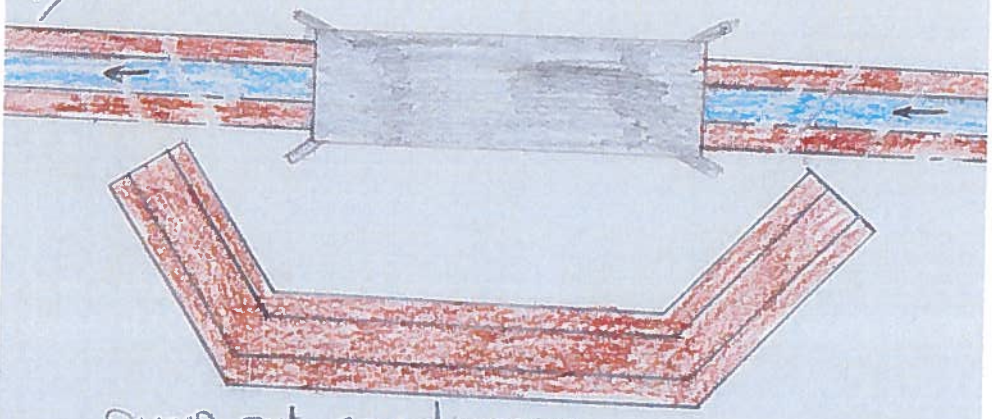
Remove upstream dam from original watercourse and dam upstream of the diversion.

10/



Dam downstream of the diversion
Carry out electrofishing and transfer
any fish to original watercourse

11/



pump out new diversion
and backfill

12/

Completed online culvet

Appendix C – Example Temporary Retention Pond Calculations

A5 WTC
Mainline PED

Schedule of Mainline Ditches

5082906/151/ISH
October 2011
Values Copied for issue in A5WTC_S1_SCH_05_00407
Rev June 2012 - Outfall watercourses identified

Earthworks impermeability = 12.50%
V before lining (m/s) = 1
Depth of ditch = 0.75m
Nominal drainage provision

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area N'bound Side (ha)	Impermeable Contributing Area S'bound side (ha)	Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse Description	Watercourse ID	WFD Waterbody ID
Southbound Side									
1	580-680	-	0.156	34	Pipe to S114 - 225Ø?	34	River Foyle via Mainline drainage		
1	680-900	-	0.369	68	Pipe to S116 - 225Ø?	68	River Foyle via Mainline drainage		
1	900-1240	-	0.58	111	Cross carriageway to separate outfall	111	River Foyle at Ch 1030		
1	1240-1300	-	0.203	33	Direct to watercourse on S'bound side	144	Diversion ID S1-WD-01	UD_0.1 / -	UKGBNI5NW250010
2	1300	-	0.194	32	Land drains direct to watercourse				
2	1300-1500	-	0.506	79	Direct to watercourse on S'bound side				
2	1500-1670	-	0.457	74	Cross carriageway to N'bound earthworks	74	Via N'bound earthworks to R Foyle at S1 OF: 25		
Junction	1670-1875	-	-				No allowance for Junction PED		
3	1875-1960	-	0.322	53	To Mainline or N'bound earthworks	115	Via N'bound earthworks to R Foyle		
3	1960-2120	-	0.418	62	To Mainline or N'bound earthworks				
3	2120-2285	-	0.482	67	To Mainline or N'bound earthworks	96	Via N'bound earthworks to R Foyle		
3	2285-2400	-	0.211	29	To Mainline or N'bound earthworks				
3	2400-2480	-	0.278	41	Direct to watercourse (Gortin Hall Drain) on S'bound side	221	Gortin Hall Drain - Diversion ID S1-WD-16	Gortin Hall Drain / River 2	UKGBNI5NW250010
4	2480	-	0.307	50	Land drains direct to watercourse (Gortin Hall Drain)				
4	2480-2825	-	0.806	130	Direct to watercourse (Gortin Hall Drain) on S'bound side				
4	2825-3045	-	0.92	116	Direct to watercourse on S'bound side	185	Diversion ID S1-WD-02	UD_0.2/ -	UKGBNI5NW250010
4	3045-3225	-	0.511	69	Direct to watercourse on S'bound side				
4+5a	3225-3400	-	0.453	61	Direct to watercourse on S'bound side	120	Blackstone Burn Diversion ID S1-WD-03 Ch 3480-3740 drains through rise in ground	Blackstone Burn / -	UKGBNI5NW250010
5	3400-3480	-	0.098	17	Direct to watercourse on S'bound side				
5	3480-3740	-	0.211	42	Cross carriageway to N'bound earthworks or separate outfall				
5	3740-3860	-	0.101	19	Combines with side road drainage to discharge to diverted watercourse	219	Dunnalong Road. Diversion ID S1-WD-05	UD_0.4/ -	UKGBNI5NW250010
5	3860-3935	-	0.482	49	Conbines with above to discharge to diverted watercourse				
5	3740-3935	-	0	111	Collector ditch includes flow from side road				
5	3935-4290	-	0.142	22	Direct to watercourse on S'bound side				
5	4290-4495	-	0.106	18	Direct to watercourse on S'bound side				
5	4495-4670	-	0.942	118	Cross carriageway to N'bound earthworks				
5	4670-5040	-	0.944	143	Cross carriageway to N'bound earthworks. Includes contribution from side road				
5	5040-5400	-	1.422	208	Cross carriageway to N'bound earthworks				
5	5400-5595	-	0.787	104	Direct to drain on S'bound side. Pipe beneath side road.	173	Unreferenced watercourse at Ch 5595. Opposite Ballybeeny Road	Unreferenced	
5	5595-5750	-	0.445	69	Direct to drain on S'bound side.				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
5	5750-5800	-	0.149	25	Direct to watercourse on S'bound side	637	Diversion ID S1-WD-06. Subject to further detail as ddesign for Bready Cut is developed	UD_05 / River 4	UKGBNI5NW250010
5	5800-6340		0.906	612	Alternative with drainage from 6340-6475. At detail design split between draining to watercourse and side road				
5	5800-6340	-	0.906	158	At detail design split between draining to watercourse and side road drainage				
5	6340-6475	-	0.778	454	Alternative with drainage from 6475-7055 and crosses Victoria Road				
5	6340-6475	-	0.778	137	Crosses Victoria Road to connect to 5800-6340				
5	6475-7055	-	2.76	317	Alternative - connect to drainage in 6340-7055 "Cascade" down slope				
5	6475-7055	-	2.76	317	Connect to Mainline carriageway to ponds to north "Cascade" down slope				
6a	7055-7340	-	0.676	142	Pipe beneath Mainline to discharge to new ditch. (Nom ditch length for grad) "Cascade" down slope	639	To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed.	Bready Village watercourse/culvert	
6a	7340-7835	-	3.51	396	Pipe beneath Mainline to discharge to new ditch.				
6a	7835-8245	-	1.27	151	Direct to watercourse on S'bound side				
6b	8245-8485	-	0.183	28	Direct to watercourse on S'bound side	78	Diversion ID S1-WD-07. Ch7835-8245 split 2:1 to north and south respectively	UD_07 / River 4	UKGBNI5NW250010
6b	8485-8800	-	0.37	61	Connection to Mainline carriageway or N'bound toe of batter - see drg				
6b	8800-9150	-	1.203	133	Culvert beneath Victoria Road to Low Point at Ch9215	342	Burn Dennet S1 OF: 11	Burn Dennet	
6b	8800-9150	-	0	0	Subsidiary ditch between side road and Mainline to drain side road and batter. Culvert under side road.				
7	9150-9500	-	0.306	38					
7	9215	-	0	171	Pipe from Low Point at Ch9215 to				
	9500-9600	-	0.118	18	Drains to 9600-9770				
7	9600-9770	-	0.276	62	Includes flow from 9500-9600				
7	9770-10015	-	0.315	279	Includes flow from 9600-9770, and Low Point at Ch9215				
7	10015-10190	-	0.13	19					
7	10015	-	0	298	Pipe from Low Point at CH10015 to watercourse. Includes flows from Ch9770-10015 and Ch 10015-10190. Could be twin 525Ø or triple 450Ø				
7	10190-10500	-	0	0	Land falls away from road to watercourse. Nom. earthworks drain				
8	10500-10750	-	0.218	44	Ditch direct to watercourse				
8	10750-11000	-	0.074	11	Ditch direct to watercourse	27	Diversion ID S1-WD-08.	Ballydonaghy Drain / -	UKGBNI1NW010101070
8	11000-11220	-	0.08	16	Ditch direct to culvert				
8/9	11220-11880	-	0	0	Upslope intercepted by Victoria Road. Nom. earthworks drain				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
10	11880-12225	-	0.563	90	Culvert beneath Mainline to watercourse on N'bound side	90	Unreferenced watercourse on N'bound side at Ch12047	Unreferenced	

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
10	12225-12370	-	0.412	62	Ditch direct to watercourse	62	Unreferenced watercourse ay Ch12370	Unreferenced	
10	12370-12585	-	1.081	140	Ditch direct to watercourse	140	To upstream end of Culvert S1-PC-10.		
10	12585-12740	-	0.464	73	Ditch direct to watercourse	103	Glenmornan River	Glenmornan River	
10/11	12740-13010	-	0.194	30	Ditch direct to watercourse				
11	13010-13290	-	0.402	57	Ditch direct to watercourse	57	To upstream end of culvert adjacent to S1 OFS: Greenlaw Road 1		
11	13290-13500	-	0.199	33	Ditch direct to watercourse	33	To watercourse adjacent to Park Road		

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
	13500-18000	-	0	0	Land generally flat with ex watercourses, falls from Mainline or intercepted by ex road. Nom earthworks drain		This PED is beyond Junction 3. Outfall information not yet completed.		
17	18000-18180	-	0.15	24	Ditch direct to watercourse				
17	18180-18370	-	0.232	31	Ditch to connectivity culvert then pipe to watercourse				
17	18370-18680	-	0.507	59	Ditch to connectivity culvert then pipe to watercourse				
17	18370	-	0	90	Pipe from ditches to watercourse				
18	18680-19085	-	0.111	12	Ditch direct to watercourse				
	19085-19235	-	0	0	Houses back onto Mainline. Nom. earthworks drain				
19	19235-19575	-	0.106	15	Ditch direct to watercourse				
	19575-19670	-	0	0	Picked up by side road drainage				
	19670-20360	-	0	0	Land falls away from Mainline in cutting				
21	20360-20425	-	0.038	9	Trapped at crest of cutting - connect to Mainline				
	20425-20890	-	0	0	Land falls away from Mainline. Check reinstatement levels for ex pond/quarry. Nom. drainage provision				
21	20890-21190	-	0	51	Land falls away from Mainline. Ditch required to convey flows from higher catchments to watercourse				
21	21190-21260	-	0.029	51	Also conveys flows from higher catchments				
21	21260-21380	-	0.031	45	Also conveys flows from higher catchment. Culvert beneath side road may not be required if side road is stopped up				
21	21380-21620	-	0.282	38	Head of run flowing N'bound. Culvert beneath side road				
22	21620-22000	-	0.562	73	Ditch to diverted watercourse				
22	22000-22290	-	0.316	82	Ditch to diverted watercourse. Also conveys flows from higher catchment				
22	22290-22480	-	0.126	22	Head of run flowing N'bound. Culvert beneath side road				
22	22480-22799	-	0.363	51	Connects to Section 2 PED , or separate outfall to watercourse (not included)				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
Northbound Side									
	500-3400	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	3400-3860	0	-	0	Land falls away from Mainline in cutting				
	3860-4050	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	4050-4940	0	-	0	Land falls away from Mainline in cutting				
	4940-6590	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	6590-6700	0	-	0	Land falls away from Mainline in cutting				
	6700-7200	0	-	0	Land falls away from Mainline. Nom. toe of bund drain				
	7200-7300	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
6a	7300-7825	0.412	-	43	Land direct to new ditch at toe of batter	271	To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed.	Bready Village watercourse/culvert	
6a	7825-8145	0.502	-	93	Via ditch to new ditch at toe of batter				
6a	7300-8145	0	-	135	New toe of batter ditch - NB cuts through hill. Excavation through hill required.				
	8145-8230	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	8230-8430	0	-	0	Land falls away from Mainline in cutting				
	8430-8860	0	-	0	Land falls away from Mainline. Nom. toe of bund drain				
	8860-9970	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
7a	9970-10035	0.02	-	6	Trapped against Mainline. Effect of wc div culvert?	65	Burn Dennet S1 OF: 12 or further downstream - subject to further detail	Burn Dennet	
7a	10035-10260	0.45	-	59	Ditch with pipe to watercourse				
	10260-10710	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	10710-10790	0	-	0	Land falls away from Mainline in cutting				
8a	10790-10985	0.043	-	11	Ditch direct to watercourse	11	Diversion ID S1-WD-08.	Ballydonaghy Drain / -	UKGBNI1NW010101070
	10985-11355	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	11355-12300	0	-	0	Land falls away from Mainline in cutting				
	12300-14160	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	14160-14340	0	-	0	Land falls away from Mainline in cutting				
	14340-14400	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	14400-14800	0	-	0	Land falls away from Mainline in cutting				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
	14800-19554	0	-	0	Land falls away from Mainline. Nom. toe of batter drain		This PED is beyond Junction 3. Outfall information not yet completed.		
20	19554-19770	0	-	239	Ditch to convey flow from higher catchment. Then picks up side road and junction drainage				
20	19770-20095	0.444	-	239	Conveys flow from higher catchment. Ditch cuts through ridge. Additional excavation required				
20	20095-20250	0.474	-	168	Conveys flow from higher catchment. At downstream end the ditch begins to run against gradient. Additional excavation required.				
20	20250-203900	0.332	-	92	Conveys flow from higher catchment				
21	20390-20500	0.182	-	32	Ditch from high point. Pipe beneath side road				
21	20500-20580	0	-	0	Land falls away from Mainline in cutting				
21	20580-20890	0.054	-	10	Ditch to watercourse by pond				
21	20890-21235	0	-	278	Ditch to convey flow from higher catchment and side road. Land is flat so ditch may also drain some of this area.				
21	21235-21435	2.168	-	278	Contributing area is conservative.				
	21435-21925	0	-	0	Land falls away from Mainline in cutting				
	21925-22000	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
22	22000-22350	0.202	-	32	Ditch runs through junction				
	22350-22799	0	-	0	Land falls away from Mainline in cutting				

Appendix D – Watercourse Haul Road Crossing Details

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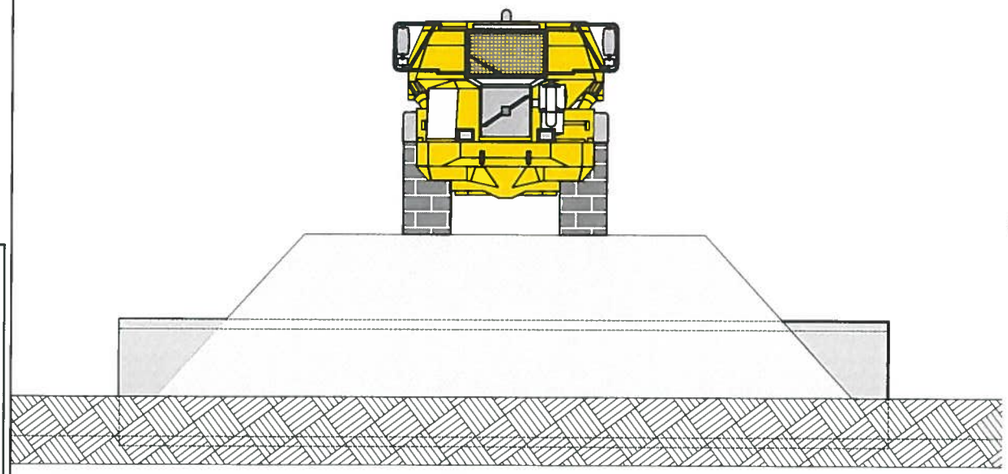
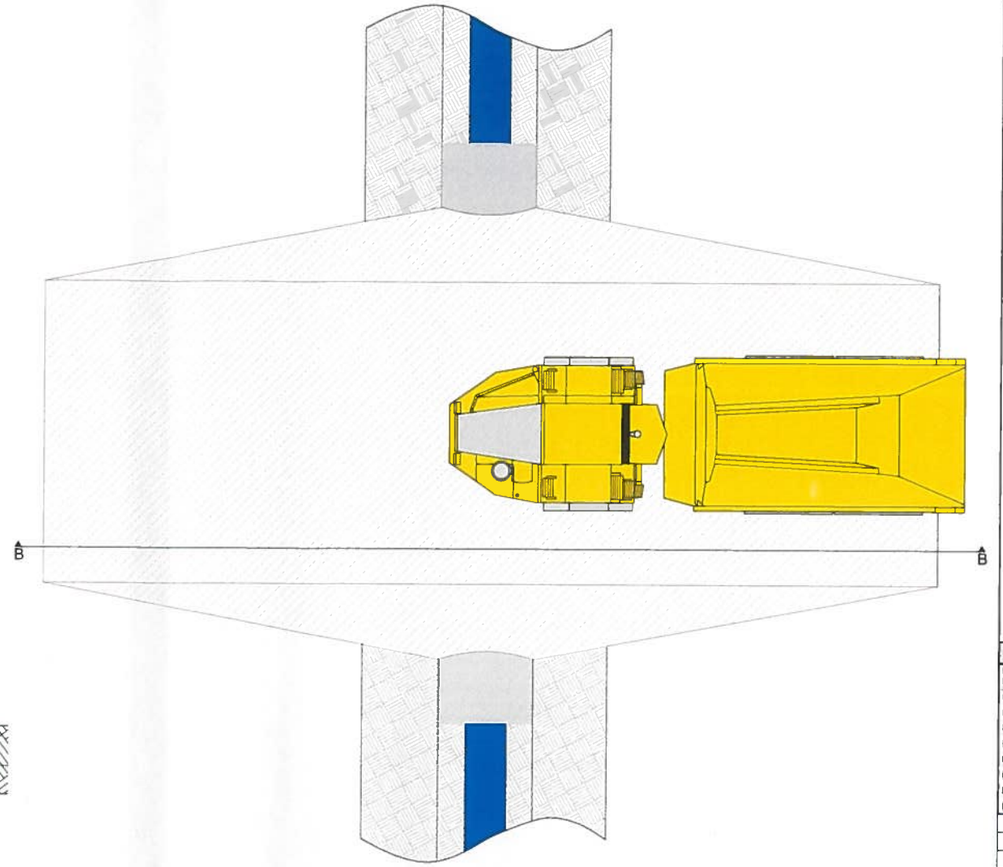


SECTION A-A



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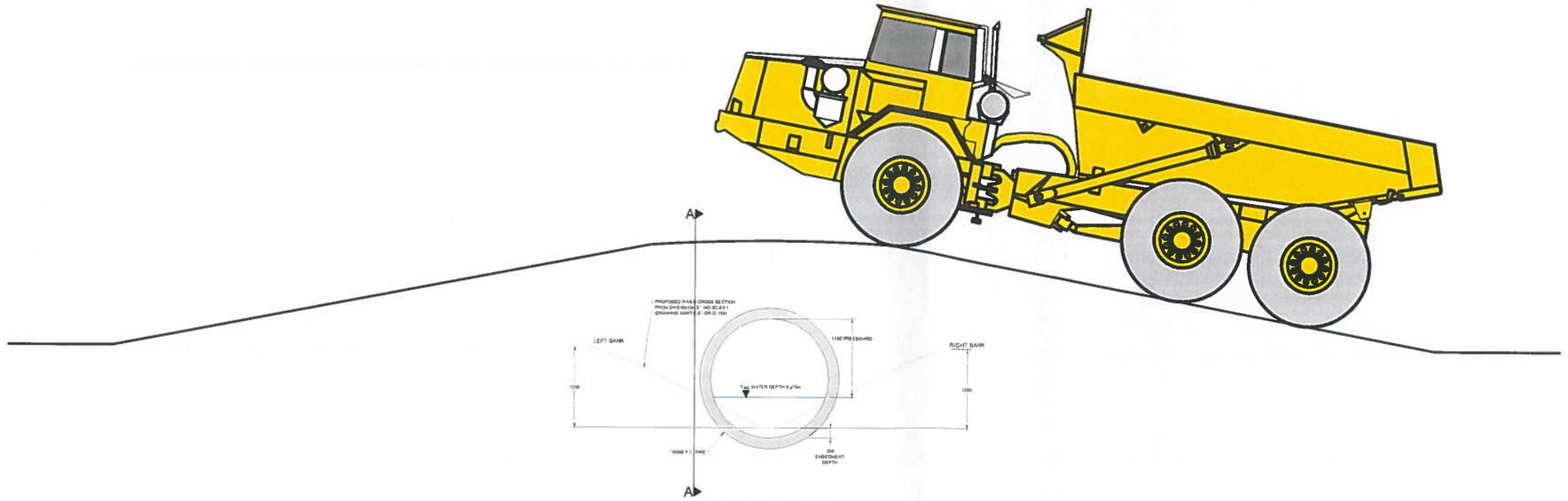

SECTION B-B

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CONSTRUCTION NOTES

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
(ENTER 'NONE' IF APPLICABLE)

MAINTENANCE/CLEANING
(ENTER 'NONE' IF APPLICABLE)

USE
(ENTER 'NONE' IF APPLICABLE)

DECOMMISSIONING/DEMOLITION
(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	18/04/13 PMG	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5 WTC Western Transport Corridor

Designer: Arup Atkins

Contractor: BbM

Title: WATERCOURSE PIPE CROSSING GENERAL ARRANGEMENT

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	NTS	PMG Date: 18/04/13	Date:	Date:

Status	Drawing Number	Rev
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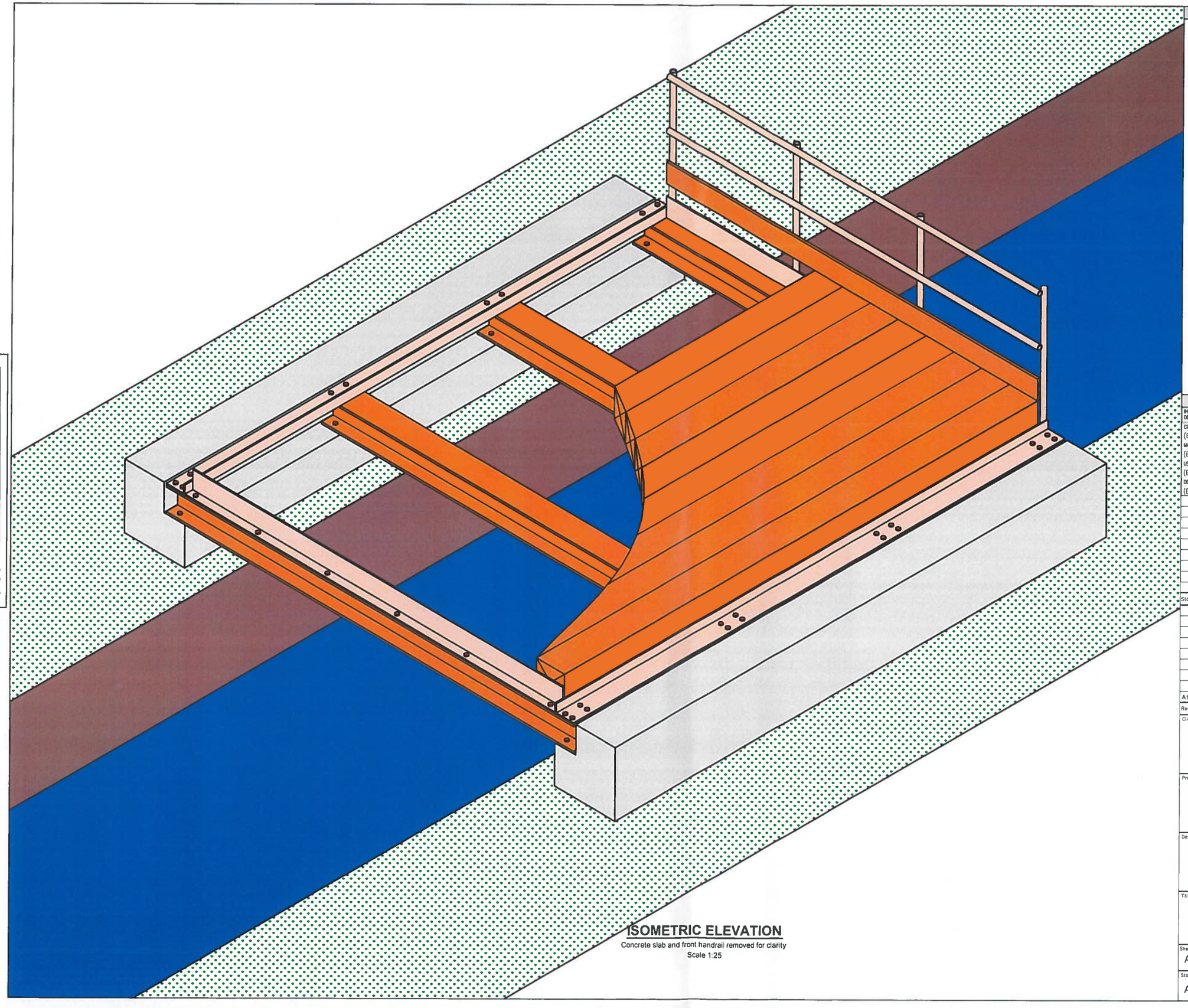
DO NOT SCALE

A1



ISOMETRIC ELEVATION

Concrete slab and front handrail removed for clarity

Scale 1:25

CONSTRUCTION NOTES

1. Concrete has been designed to BS8110
2. Steel has been designed to BS5950-1-2011
3. The bridge has been designed for a CAT D740 dumptruck +10% overload
4. Dimensions are in millimeters

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

(ENTER 'NONE' IF APPLICABLE)

MAINTENANCE/CLEANING

(ENTER 'NONE' IF APPLICABLE)

USE

(ENTER 'NONE' IF APPLICABLE)

DECOMMISSIONING/DEMOLITION

(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	PMG 16/04/13	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5WTC Western Transport Corridor

Designer: Arup Atkins

Contractor: BbM

Title: A5WTC-Section 1-Temporary works watercourse bridge

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:20	PMG Date: 16/04/13	Date:	Date:

Status	Drawing Number	Rev
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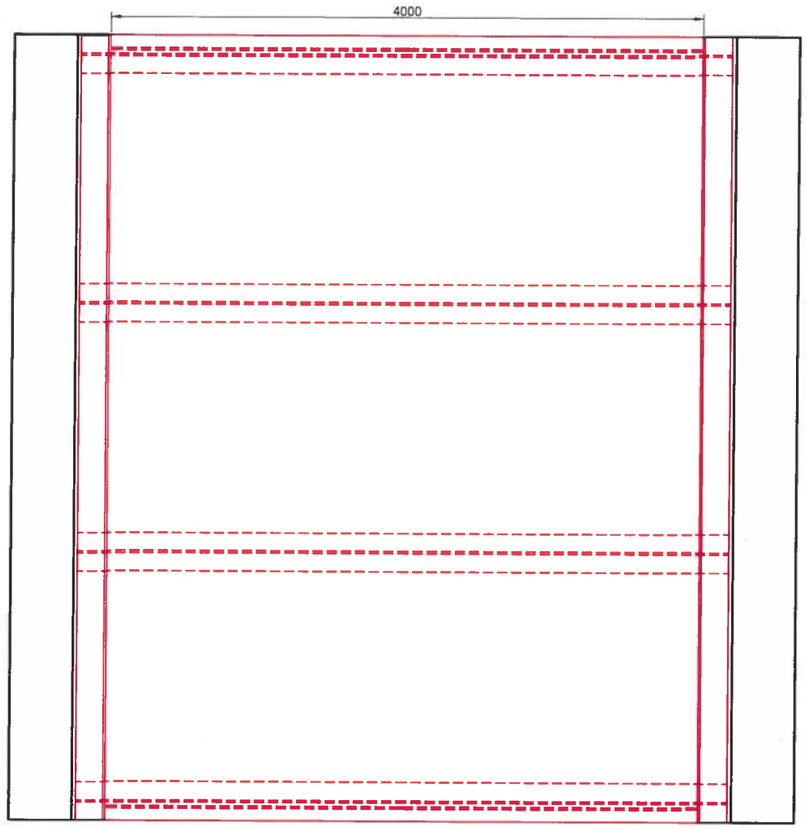
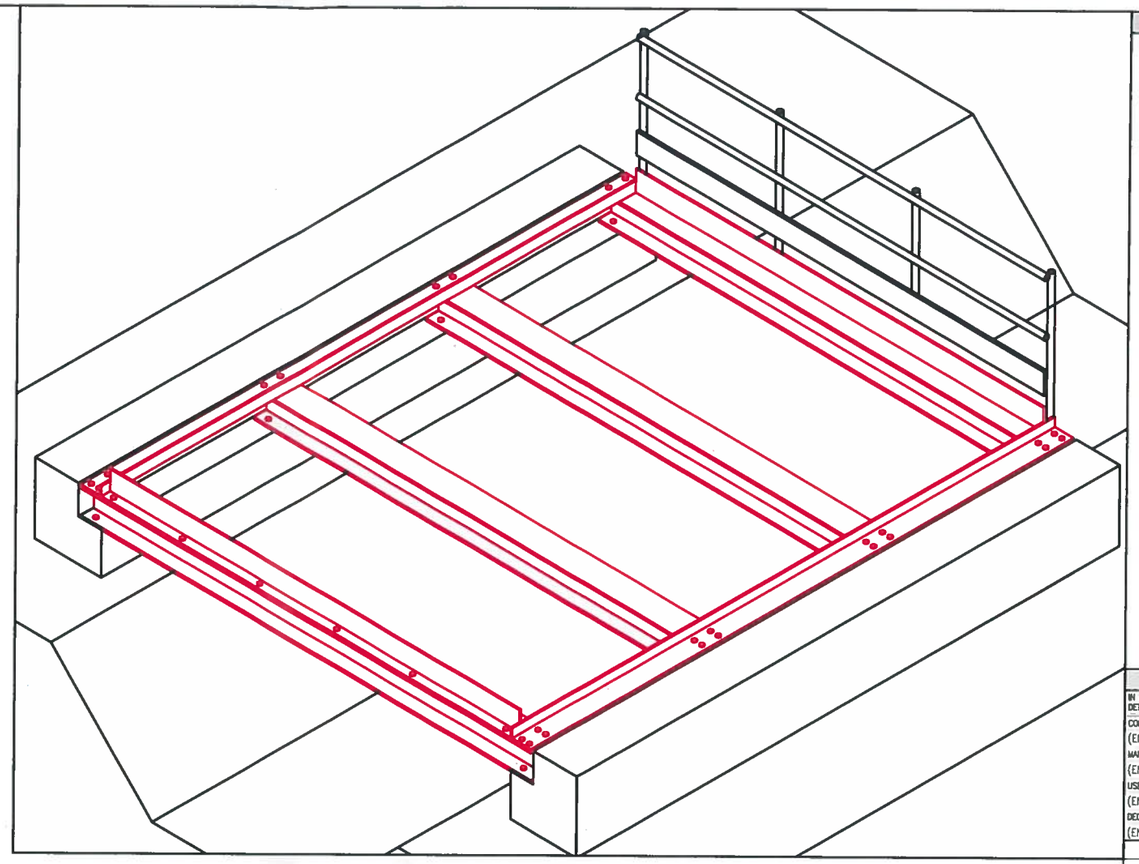
DO NOT SCALE

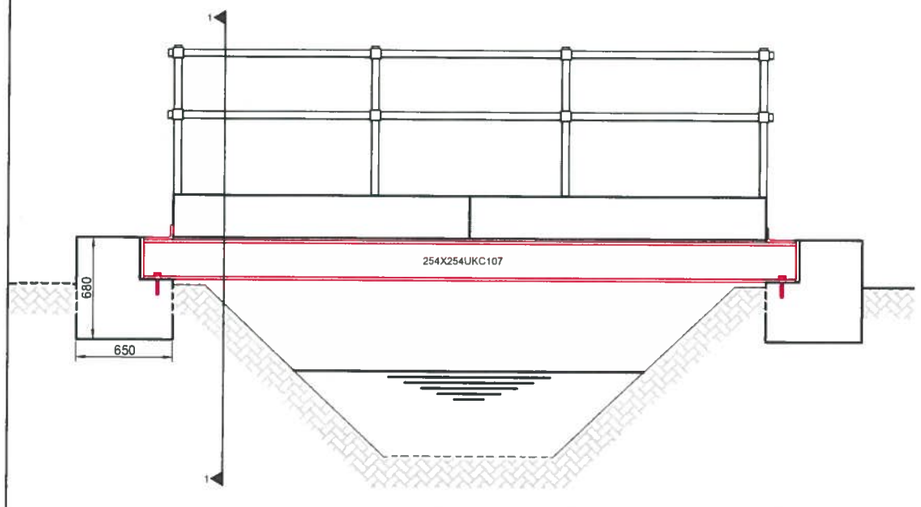
A1



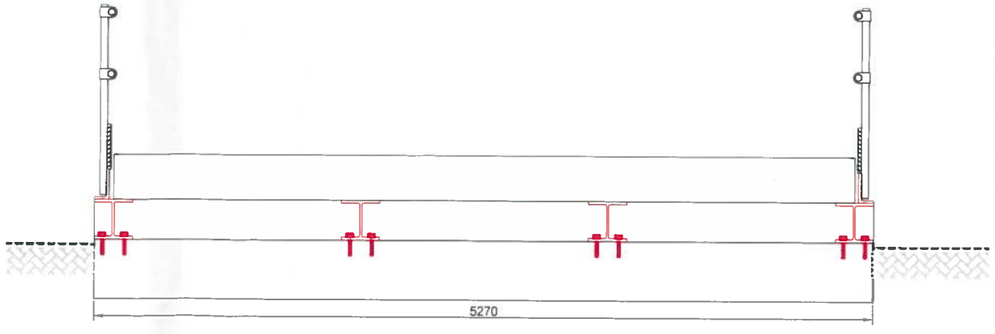
PLAN
Scale 1:20



ISOMETRIC ELEVATION
Concrete slab and front handrail removed for clarity
Scale 1:25



ELEVATION
Scale 1:20



SECTION 1-1
Scale 1:20

CONSTRUCTION NOTES

1. Concrete has been designed to BS8110
2. Steel has been designed to BS5950-1-2011
3. The bridge has been designed for a CAT D740 dumptruck +10% overload.
4. Dimensions are in millimeters

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
(ENTER 'NONE' IF APPLICABLE)
MAINTENANCE/CLEANING
(ENTER 'NONE' IF APPLICABLE)
USE
(ENTER 'NONE' IF APPLICABLE)
DECOMMISSIONING/DEMOLITION
(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	PMG 16/04/13	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5 WTC

Designer: Arup Atkins

Contractor: BbM

Title: A5WTC-Section 1-Temporary works watercourse bridge

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:20	PMG Date: 16/04/13	Date:	Date:

Status	Drawing Number	Rev
A1	A5WTC-S1-DRG-16042013	A1

Appendix 7 – Otter Information

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Table A7.1 Otter Survey Results

Site No.	Watercourse ID	X coordinate	Y Coordinate	Access	Otter Presence
0	UD_01	240518	412322	Partial	No
1	Gorton Hall Drain	239812	411376	Yes	No
2	UD_02	239465	410914	Yes	No
3	Blackstone Burn	239252	410747	Yes	No
4	UD_03	238920	410338	No access	-
5	UD_04	238895	410292	No access	-
6	UD_04	238768	410106	Partial	No
7	UD_05	237639	408918	Yes	No
8	UD_06	237421	407999	Partial	No
9	UD_07	237381	406518	Partial	No
10	Burn Dennet	236997	404327	Yes	Yes
11	Ballydonaghy Drain	237078	403823	Partial	No
12	FD_04	236531	402429	Yes	No
13	Glenmornan River	236442	402331	Yes	Yes
14	UD_15	233537	391077	Partial	No
15	UD_19	234650	389867	Partial	No
16	River Derg	236058	387484	Yes	Yes
17	Derg 0.3	236329	387560	Yes	Yes
18	UD_20	237340	385896	No access	-
19	Scotts Mill Layde	238242	385396	No access	-
20	UD_21	238940	385098	No access	-
21	UD_22	239879	384715	Yes	No

Site No.	Watercourse ID	X coordinate	Y Coordinate	Access	Otter Presence
22	UD_23	240896	383873	Yes	No
23	UD_24	241275	383339	Yes	No
24	UD_25	241363	383036	Yes	No
25	UD_26	241477	382793	No access	-
26	UD_28	241689	381979	Yes	No
27	UD_29	241667	381791	Yes	No
28	UD_30	241668	381630	Yes	No
29	UD_31	241649	381478	Yes	No
30	UD_32	241636	381256	Yes	No
31	UD_33	241740	380881	Yes	No
32	UD_34	241785	380691	Yes	No
33	UD_35	241837	380399	Yes	No
34	UD_36	241872	380267	Yes	Yes
35	UD_37	241550	378531	Partial	No
36	UD_39	241807	377996	Yes	No
37	UD_42	241815	377387	Partial	Yes
38	UD_43	241864	377081	Partial	No
39	Tully Drain	242597	375692	Yes	No
40	Fairywater	242786	374948	No access	-
41	UD_48	242552	374012	Yes	Possible
42	UD_49	242628	373688	No access	-
43	UD_50	242835	372426	No access	-
44	UD_52	243071	371960	Yes	No
45	UD_53	243146	371807	Partial	No

Site No.	Watercourse ID	X coordinate	Y Coordinate	Access	Otter Presence
46	UD_54	243344	371521	Yes	Yes
47	Fireagh Lough Drain	243512	371284	Yes	No
48	UD_55	243730	371086	Yes	No
49	UD_56	244479	370513	Yes	No
50	Loughmuck	245084	369615	Partial	No
51	Drumragh River	245297	369442	Partial	Yes
52	Freughmore Drain	246057	369281	Partial	Yes
53	UD_57	246718	369085	Partial	No
54	UD_58	247174	369123	Yes	No
55	UD_108	247324	368974	Yes	No
56	UD_109	248168	367960	Partial	No
57	Ranelly Drain	248331	367700	Yes	No
58	Ranelly Drain	248589	367147	Partial	No
59	Ranelly Drain	248674	366568	Partial	No
60	Ranelly Drain	248717	366356	Partial	No
61	Ranelly Drain	248768	366170	Partial	No
62	Ranelly Drain	248867	366118	Partial	No
63	UD_60	249283	365494	Partial	No
64	UD_61	249862	364892	Partial	No
65	Letfern	250467	364031	Partial	No
66	UD_63	251210	363325	Partial	No
67	UD_65	251569	363033	Partial	No
68	UD_66	251652	362851	Partial	No
69	UD_67	252195	362129	Partial	No
70	Routing Burn	252386	361836	No access	-
71	UD_68	252620	361504	Partial	No

Site No.	Watercourse ID	X coordinate	Y Coordinate	Access	Otter Presence
72	UD_69	252847	361179	Partial	No
73	UD_70	253022	360887	Partial	No
74	UD_70	253134	360597	No access	-
75	UD_71	253365	359956	Partial	No
76	UD_110	254305	358956	No access	-
77	UD_110	254846	358635	Partial	Yes
78	UD_111	255558	357922	Partial	Yes
79	UD_76	256325	357319	Partial	No
80	UD_77	256579	357265	Partial	Yes
81	UD_79	257225	357103	Yes	No
82	UD_80.3	257784	356994	Yes	No
83	UD_80	258802	356899	Partial	Yes
84	Roughan	259693	356576	Yes	Yes
85	UD_81	259997	356564	Partial	No
86	UD_81.2	261165	356316	Partial	No
87	UD_82	262067	356307	Yes	Yes
88	Ballygawley Water	262369	356492	Yes	Yes
89	UD_83	262251	356296	Yes	No

NIEA Agreed Otter Mitigation Procedure

Introduction

Two otter holts have been identified within the landtake of the proposed A5 WTC, with a further holt identified within close proximity of the works, in addition a number of couches or suspected couches have been identified within or in proximity to the landtake. Furthermore, a site with high potential for natal den presence has been recorded at Strabane Nature Reserve, this site could not be investigated fully due to density of vegetation, and thus a precautionary approach has been used in assessing potential impacts at this location.

This method statement has been created to avoid or reduce impacts of works at the specific locations where otter resting places are present and where suspected breeding is taking place. Further detail will be developed following pre-construction surveys and consultation with NIEA staff.

The confirmed otter holts within the landtake are at the Derg River (236185,387548) and along the Fairy Water (242717,374998). The confirmed holt close to the landtake is adjacent to Strabane Nature Reserve (233998,398502). The mitigation measures proposed are designed to safeguard otter during and following construction of the A5 WTC scheme, the measures intend to ensure that:

• Individual otter are not killed or injured during construction.

• No otter holt is damaged unnecessarily, and otters occupying holts are not harmed or disturbed.

• Where a holt must be removed for the construction works, adequate measures are taken to protect otters, and to replace the lost holt.

• Commuting and foraging otters within close vicinity of identified holts are not disturbed by construction works.

Pre-construction surveys Holts and couches

For the holts and couches a pre-construction survey will be undertaken at least 6 weeks prior to construction commencing within 100m of the site. The site will then be monitored on a weekly basis throughout the works. If otter are deemed to be present during the pre-construction survey, a licence will be required and detailed discussions with NIEA will be undertaken to determine the most appropriate course of action, including closure methods, and provision of replacement holts. The otter monitoring survey will use camera trapping to assess otter activity at each holt location. Camera traps will be set up and will then be visited on a monthly basis to collect data and maintain the camera traps. During these visits, the holts and immediate surrounding area will be surveyed for field signs of otter activity, such as otter spraints and footprints.

Strabane Nature Reserve potential natal site

For the potential natal site at Strabane Nature Reserve, a pre-construction monitoring survey for otter commenced in July/August 2016, more than 12 months prior to proposed construction work

commencing. The otter monitoring survey is using camera trapping to assess otter activity at each holt location. Camera traps were set up and are visited on a monthly basis to collect data and maintain the camera traps. During these visits, the holts and immediate surrounding area are surveyed for field signs of otter activity, such as otter spraints and footprints.

The data collected during the otter monitoring survey will be used to create update reports which will be issued to Northern Ireland Environment Agency (NIEA). Update reports will continue to be issued to NIEA once construction is underway.

Camera traps can look suspicious to members of the public. To prevent terrorism concerns arising from the public finding the camera traps, the local police have been informed of the camera trap study prior to camera traps being set up.

Protection Measures – During Construction Holts and couches

Prior to construction, a robust barrier will be erected to demarcate a 30m exclusion zone surround each otter holt or couch. This will exclude otters from the construction area and will protect otter holts and couches from damage by the works. This barrier can be in the form of a sturdy fence or an earth bund, but must be sufficient to restrict otters from entering the works area and restrict machinery from coming close to the otter holt or couch. This barrier will be maintained throughout the duration of the works.

Where a confirmed holt or couch cannot be avoided by the works a detailed method statement for closure of the resting place will be developed in consultation with NIEA, and a licence sought to permit the works. Mitigation measures in these cases will include provision of a replacement holt at the edge of the vesting line, or in a suitable location agreed with NIEA.

A toolbox talk will be provided to contractors prior to work commencing. The talk will be delivered by a suitably experience ecologist who will explain the legal protection afforded to otters, highlight sensitive areas within the construction area and discuss appropriate working methods to ensure otters are safeguarded.

An Ecological Clerk of Works will be appointed ahead of construction commencing. The Ecological Clerk of Works will undertake tasks including pre-construction site checks of areas close to otter holts and supervision of works. As a minimum requirement, the Ecological Clerk of Works will undertake weekly visits to the construction sites adjacent to otter holts and couches.

Works within 100m of otter holts and couches will be restricted to daylight hours to avoid the peak activity period for otter (which is after sunset and before sunrise). Artificial construction lighting will be avoided within this area. Trenches or excavations within 250m of the otter holt or couch will be covered at the end of every working day, or a ramp will be installed to ensure otters are not trapped within excavations. Removal of bankside vegetation within 30m of an otter holt or couch will be avoided unless unavoidable, in which case a licence will be sought from NIEA prior to such works commencing.

Construction works within close vicinity of rivers or drainage channels will be undertaken in accordance with best practice guidelines. This includes adherence to the methods and best

practice described the Pollution Prevention Guidelines (PPG)[1] cooperatively developed by NIEA, the Environment Agency for England and Wales and the Scottish Environment Protection Agency (SEPA) for Scotland.

Strabane Nature Reserve potential natal site

If the site be confirmed as a natal site by pre-construction survey, no works will be undertaken within 150m of the woodland edge prior to NIEA granting a licence.

As otter cubs can remain within the natal site for up to 10 weeks, daily monitoring of the camera trap at the outfall of the small watercourse to the main river will be undertaken until cubs are recorded leaving the site and not returning.

At this point, sensitive clearance of the woodland vegetation which falls within the works area will be undertaken, minimising removal as far as possible. These works will be overseen by an Ecological Clerk of Works, following a careful search of the site, using non-powered hand tools to remove minimal vegetation to facilitate access to the site.

Once the vegetation has been removed a 1.8m high (minimum) close board fence will be erected along the edge of the remaining woodland.

Protection Measures – Post Construction Holts and couches

When construction is complete the otter fence/earth bund should be carefully removed. The 50m area of bankside directly surrounding each otter holt or couch, including areas that may have been disturbed during the works, will be re-planted with appropriate vegetation. Hawthorn will be planted in the area immediately surrounding each holt/couch/replacement holt. This will provide additional protection for and help to prevent future disturbance.

A post-construction otter monitoring survey will be undertaken for 18 months following construction completion to assess if the works have affected otter activity. The monitoring survey will follow the same methods used in the preconstruction monitoring surveys and data collected will be used within update reports which will continue to be issued to NIEA every three months. A final report will be issued to NIEA following completion of the monitoring survey.

Otter-proof fencing is to be installed along the boundary of the newly constructed A5 WTC to reduce the risk of road casualties from otters that are not accustomed to the new road. A 150m stretch of fencing will be installed at the edge of the TNI landownership, or in a location to be agreed with NIEA, on both sides of the road. Such fencing will tie in to an agreed otter crossing point.

Where the A5 WTC does not intersect the watercourse in the locations of the holts/couches, the fencing will be placed to rebound otters away from the road and prevent them from crossing it, and not act to direct them towards a specific crossing point. 58. 50mm wire mesh badger fencing will be used, as described in the DMRB (Volume 10, Section 1, Part 5, Chapter 9. This type of 1.

[1] http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides.aspx

fencing will be robust enough to prevent the fence from being undermined by badgers and rabbits. The addition of a 300mm mesh overhang at the top, as described within DMRB is not seen as essential by Dr Paul Chanin, however it will be included if NIEA require it.

Strabane Nature Reserve potential natal site

Should evidence of otter breeding activity be confirmed by the preconstruction survey works, the close board fencing will be retained at this location, and maintained in perpetuity.

Landscape planting adjacent to the nature reserve will replace lost habitat over time, and serve to bolster the site's appeal to breeding otter.

Additional planting will be included around the adjacent SUDs pond to connect to the remaining portion of the Nature Reserve.

Landscape maintenance plans for this section of the landscape scheme will include notes on otter presence and measures maintenance contractors must take to prevent disturbance to otter at this location.

Appendix 8 - Designated Site Natura 2000 Standard Data Forms

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NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE	*1.2. SITE CODE*	*1.3. COMPILATION DATE*	*1.4. UPDATE*
K	IE0002301	200306	

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0004057

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland.

1.7. SITE NAME:

River Finn

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI:	*DATE CONFIRMED AS SCI:*
200306	
DATE SITE CLASSIFIED AS SPA:	*DATE SITE DESIGNATED AS SAC:*

2. SITE LOCATION

2.1. SITE CENTRE LOCATION

LONGITUDE	LATITUDE
W 7 46 0	54 48 0

W/E (Greenwich)

2.2. AREA (HA):

5501.79

2.3. SITE LENGTH (KM):

2.4. ALTITUDE (M):

MINIMUM	MAXIMUM	MEAN
-2	400	150

2.5. ADMINISTRATIVE REGION:

NUTS CODE	REGION NAME	% COVER
IE011	Border	94

Marine area not covered by a NUTS-region

2.6. BIOGEOGRAPHIC REGION:

Alpine	Atlantic	Boreal	Continental	Macaronesian	Mediterranean
☐	☑	☐	☐	☐	☐

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	GLOBAL ASSESSMENT
7130	16	**B**	**C**	**C**	**B**
3110	16	**B**	**B**	**B**	**B**
4010	3	**B**	**C**	**C**	**C**
7140	1	**B**	**C**	**B**	**B**

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
A037	Cygnus columbianus bewickii			1-13 i		C	B	C	
A038	Cygnus cygnus			<571 i		B	B	C	
A103	Falco peregrinus	2 p				C	B	C	
A098	Falco columbarius	1-2 p				C	B	C	
A140	Pluvialis apricaria			371 i		C	B	C	

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
A067	Bucephala clangula			133 i		C	B	C	
A043	Anser anser			<349 i		B	B	C	
A050	Anas penelope			64 i		C	B	C	
A052	Anas crecca			573 i		C	B	C	
A053	Anas platyrhynchos			349 i		C	B	C	
A061	Aythya fuligula			87 i		C	B	C	
A067	Bucephala clangula			78 i		C	B	C	
A069	Mergus serrator			27 i		C	B	C	
A142	Vanellus vanellus			401 i		C	B	C	
A160	Numenius arquata			457 i		C	B	C	
A162	Tringa totanus			56 i		C	B	C	
A183	Larus fuscus		500 p			B	A	C	A
A282	Turdus torquatus		1-2 p			C	B	C	

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
1355	Lutra lutra	p				C	A	C	A

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
1106	Salmo salar		c			**C**	**A**	**C**	**A**

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

GROUP							SCIENTIFIC NAME	POPULATION	MOTIVATION			
B	M	A	R	F	I	P						
						P	Cephalanthera longifolia	p	**A**			
	M						Lepus timidus hibernicus	p	**A**			
	M						Lepus timidus hibernicus	p		**B**		
	M						Lepus timidus hibernicus	p			**C**	
	M						Meles meles	p	**A**			
	M						Meles meles	p			**C**	
		A					Rana temporaria	p	**A**			
		A					Rana temporaria	p			**C**	
			R				Lacerta vivipara	p			**C**	
				F			Salvelinus alpinus	p	**A**			
B							Lagopus lagopus	p	**A**			
B							Ardea cinerea	24 i			**C**	
B							Cygnus olor	30 i			**C**	
B							Lagopus lagopus	p			**C**	

(B = Birds, M = Mammals, A = Amphibians, R = Reptiles, F = Fish, I = Invertebrates, P = Plants)

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

Habitat classes	% cover
Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	6
Inland water bodies (Standing water, Running water)	27
Bogs, Marshes, Water fringed vegetation, Fens	25
Heath, Scrub, Maquis and Garrigue, Phygrana	7
Humid grassland, Mesophile grassland	10
Extensive cereal cultures (including Rotation cultures with regular fallowing)	5
Improved grassland	15
Broad-leaved deciduous woodland	1
Mixed woodland	1
Artificial forest monoculture (e.g. Plantations of poplar or Exotic trees)	1
Inland rocks, Screes, Sands, Permanent Snow and ice	1
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	1
Total habitat cover	**100 %**

Other site characteristics

This site comprises almost the entire freshwater element of the River Finn and its tributaries - the Corlacky, the Reelan sub-catchment, the Sruhamboy, Elatagh, Cummirk and Glashagh, and also includes Lough Finn, where the river rises. Lough Derg and a section of River Derg, and the tidal stretch of the Foyle north of Lifford to the border, are also part of the site. The underlying geology is Dalradian Schists and Gneiss for the most part though quartzites and Carboniferous Limestones are present in the vicinity of Castlefinn. The hills around Lough Finn are also on quartzite. The mountains of Owendoo and Cloghervaddy are of granite felsite and other intrusive rocks rich in silica. The rivers in the western, upland part of the site flow mainly through peat based soils, while eastwards of the Ballybofey area the main Finn channel passes though fairly intensive agricultural land. In addition to rivers, lakes, bog and heath, the site includes native broad-leaved and mixed woodland, scrub, wet grassland and freshwater marsh. Intertidal mudflats and extensive reedbeds occur along the River Foyle. Improved grassland and arable land are included for water quality reasons. The Finn passes through a number of medium sized towns, notably Lifford, Castlefinn, Stranolar and Ballybofey.

4.2. OUALITY AND IMPORTANCE:

This extensive site contains good examples of the Annex 1 habitats lowland oligotrophic lakes, blanket bog, transition mires and wet heath. Water quality of the lakes is good, as is that in most of the rivers and streams (majority classified as unpolluted). The blanket bog, which is best developed in the Owendoo/Cloghervaddy area, is typical upland bog and is fairly extensive in area. The Finn is an important system for Salmo salar, being an excellent grilse river with extensive spawning habitats. The Finn system sustains one of the only stable spring salmon populations in the country. The rivers and lakes support important populations of Lutra lutra. The upland habitats support a number of important bird species, notably Falco peregrinus and Falco columbarius (Annex I species) and Lagopus lagopus and Turdus torquatus (both Red Data Book species). Lough Derg supports the largest colony of Larus fuscus in Ireland. The section of the River Foyle within the site, along with a contiguous stretch in of the river in Northern Ireland, supports important populations of waterfowl

in autumn and winter, with an internationally important population of Cygnus cygnus, and nationally important numbers of Anser anser, Anas crecca and Phalacrocorax carbo. Salvelinus alpinus occurs in Lough Finn and possibly Lough Derg. A Red Data Book plant species, Cephalanthera longifolia, is known from the site.

4.3. VULNERABILITY

While water quality throughout much of the site is good, there are some locally polluted stretches of river within the lowlands. Pollution, emanating from agricultural activities and centres of population, is a threat to the important Salmo salar populations. Afforestation already exists in part of the Finn catchment and poses a threat to water quality and fish stocks due to acidification and sedimentition. Further afforestation in the catchment could be damaging. The blanket bog and heath habitats are vulnerable to erosion due to over-grazing by sheep. Any further drainage within peatlands would be very damaging.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State : Department of Communications, Marine and Natural Resources

Private : multiple

4.6. DOCUMENTATION

Bracken, J. J. and O'Grady, M. E. (1992). A review of freshwater fisheries research in Ireland. In Feehan, J. (ed.) Environment and Development in Ireland, pp 499-510. The Environmental Institute, UCD, Dublin.

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Central Fisheries Board (2001). Irish Salmon Catches 2000. http://www.cfb.ie/: February 2001.

Creme, G.A., Walsh, P.M., O'Callaghan, M. and Kelly, T.C. (1997). The changing status of the lesser black-backed gull Larus fuscus in Ireland. Biology and Environment. Proceedings of the Royal Irish Academy 97B: 149-156.

Doris, Y., McGarrigle, M.L., Clabby, K.J., Lucey, J., Neill, M., Flanagan, M., Quinn, M.B., Sugrue, M. and
Lehane, M. (1999). Water quality in Ireland 1995-1997. Statistical Compendium of River Quality Data. Electronic Publication on Disk. Environmental Protection Agency, Wexford.

Doris, Y., Clabby, K.J., Lucey and Lehane, M. (2002). Water Quality in Ireland 1998-2000. Statistical Compendium of River Quality Data. Electronic Publication on Disk. Environmental Protection Agency, Wexford.

Douglas, C., Dunnells, D., Scally, L. and Wyse Jackson, M. (1990). A Survey to Locate Blanket Bogs of Scientific Interest in Counties Donegal, Cavan, Leitrim and Roscommon. Unpublished report to the National Parks and Wildlife Service, Dublin.

Flanagan, P.J. and Toner, P. F. (1975). A Preliminary Survey of Irish Lakes. An Foras Forbartha, Dublin.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I., (eds.) Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Lloyd, C. (1982). Inventory of Seabird Breeding Colonies in Republic of Ireland. Unpublished report, Forest and Wildlife Service, Dublin.

Loughs Agency (2000). Mr P. Boylan provided information in a letter to Duchas

dated the 4th September 2000.

Loughs Agency, 2001. Personal correspondence from Danny Loughridge to Marie Dromey, Duchas.

McGarrigle M.L., Bowman J.J., Clabby K.J., Lucey J., Cunningham P., MacCarthaigh M., Keegan M., Cantrell B., Lehane M., Clenaghan C. & Toner P.F. (2002). Water Quality in Ireland 1998-2000. Environmental Protection Agency, Wexford.

Merne, O.J. (1989). Important Bird Areas in the Republic of Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds.). Important Bird Areas in Europe. ICBP Technical Publication No. 9, Cambridge.

Mooney, E., Goodwillie, R.N. and Douglas, C. (1991). Survey of Mountain Blanket Bogs of Scientific Interest. Unpublished draft to the National Parks & Wildlife Service, Dublin.

O'Reilly, P. (1998). Trout and Salmon Rivers of Ireland: an Anglers Guide. Merlin Unwin Books, London.

Praeger, R.L. (1934) . The Botanist in Ireland. Hodges, Figgis & Co, Dublin.

Reynolds, J.D. (1998). Ireland's Freshwaters. The Marine Institute, Dublin 1998.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Young, R. (1973). A Preliminary Report on Areas of Scientific Interest in County Donegal. An Foras Forbartha, Dublin.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

CORINE SITE CODE	OVERLAP TYPE	% COVER
800000765		
800000133		

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

CODE	INTENSITY	% OF SITE	INFLUENCE
100	**A** B C	5	+ 0 -
120	**A** B C	20	+ 0 -
140	A **B** C	60	+ 0 -
160	**A** B C	1	+ 0 -
220	A **B** C	15	+ **0** -
502	A B **C**	1	+ **0** -
701	A **B** C	5	+ 0 -
810	A **B** C	5	+ 0 -
966	A B **C**	5	+ 0 -

IMPACTS AND ACTIVITIES AROUND the site

CODE	INTENSITY	INFLUENCE
100	**A** B C	+ 0 -
120	**A** B C	+ 0 -
140	**A** B C	+ 0 -
160	**A** B C	+ 0 -
400	A **B** C	+ 0 -
403	A **B** C	+ 0 -
410	A **B** C	+ 0 -
701	A **B** C	+ 0 -
810	A **B** C	+ 0 -

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site will be prepared.

7. MAPS OF THE SITE

- Physical map

- Aerial photograph(s) included:

NUMBER	AREA	SUBJECT	DATE
OS-4112	Lough Derg	View of Lough Derg	200005
OS-2289	Strabane	View of River Finn to west of Strabane	200005

8. SLIDES

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030233**

SITENAME **Owenkillew River**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030233

1.3 Site name

Owenkillew River

1.4 First Compilation date	1.5 Update date
2001-06	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2001-06
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-05
National legal reference of SAC designation:	Regulations 6-7 and 10-12 of The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (http://www.legislation.gov.uk/nisr/1995/380/contents/made) as amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (http://www.legislation.gov.uk/nisr/2004/435/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-7.132222222	54.72777778

2.2 Area [ha]:

213.84

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKN0	Northern Ireland

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
3260			75.14		G	A	C	B	B
91A0			79.44		G	B	C	A	B
91D0	X		1.5		G	B	C	A	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive

92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
F	1096	Lampetra planeri			p				P	DD	D			
M	1355	Lutra lutra			p				C	DD	C	B	C	C
I	1029	Margaritifera margaritifera			p	10000	10001	i		G	B	C	C	B
F	1106	Salmo salar			p	1001	10000	i		G	C	B	C	C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N06	35.1
N14	4.0
N08	0.2
N07	4.5
N21	7.0
N16	45.2
N10	4.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: shingle,metamorphic,sand,neutral,nutrient-poor,sedimentary,igneous 2 Terrestrial: Geomorphology and landscape: upland,valley

4.2 Quality and importance

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation for which this is considered to be one of the best areas in the United Kingdom. Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Bog woodland for which the area is considered to support a significant presence. which is

considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Salmo salar for which the area is considered to support a significant presence. Lutra lutra for which the area is considered to support a significant presence. Margaritifera margaritifera for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02		I
M	M01		O
H	I01		I
H	H01		O
M	F02		I
L	C03		I
L	C01		I
H	B02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02		I
M	F02		I
M	B02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the DOENI link below provides access to the Conservation Objectives for this site. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

https://www.doeni.gov.uk/sites/default/files/publications/doe/land-information-owenkillew-river-conservation-objectives-2

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Northern Ireland Environment Agency
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

	Yes
	No, but in preparation
X	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030320**

SITENAME **River Foyle and Tributaries**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

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1.1 Type	1.2 Site code
B	UK0030320

1.3 Site name

River Foyle and Tributaries

1.4 First Compilation date	1.5 Update date
2004-07	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2004-07
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-05
National legal reference of SAC designation:	Regulations 6-7 and 10-12 of The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (http://www.legislation.gov.uk/nisr/1995/380/contents/made) as amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (http://www.legislation.gov.uk/nisr/2004/435/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-7.451666667	54.73611111

2.2 Area [ha]:

771.8

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

120.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKN0	Northern Ireland

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
3260			126.88		G	B	C	B	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site					Site assessment	
		Scientific									

G	Code	Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
F	1099	Lampetra fluviatilis			p				P	DD	D			
F	1096	Lampetra planeri			p				P	DD	D			
M	1355	Lutra lutra			p				P	DD	C	B	C	C
I	1029	Margaritifera margaritifera			p				P	DD	D			
F	1095	Petromyzon marinus			p				P	DD	D			
F	1106	Salmo salar			p	1001	10000	i		G	B	B	C	B

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N17	0.9
N16	5.8
N14	3.0
N08	7.9
N07	7.3
N06	31.6
N02	38.2
N10	4.5
N23	0.8
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: metamorphic,sandstone,alluvium,limestone,peat,acidic 2 Terrestrial: Geomorphology and landscape: valley,lowland 3 Marine: Geology: slate/shale General site characteristics: Soil & geology: The catchment area is dominated by metamorphic rocks of the Dalradian Super Group. These are predominatly schists derived from altered sandstones and siltstones with minor metamorphosed-limestones and dolerites. Small units of young

4.2 Quality and importance

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation for which this is considered to be one of the best areas in the United Kingdom. Salmo salar for which this is considered to be one of the best areas in the United Kingdom. Lutra lutra for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02		I
H	I01		I
H	M01		O
M	C01		I
M	F02		I
H	H01		O
M	C03		I
H	J02		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	F02		I
H	J02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the DOENI link below provides access to the Conservation Objectives for this site. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): https://www.doeni.gov.uk/sites/default/files/publications/doe/land-information-river-foyle-and-tributaries-conservation-ob

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

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5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Northern Ireland Environment Agency
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

Appendix 9 – Site Integrity Checklists

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Table A9.1 River Foyle & Tributaries SAC Integrity of Site Checklist

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No
Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Table A9.2 River Finn SAC Integrity of Site Checklist

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No
Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Table A9.3 Owenkillew SAC Integrity of Site Checklist

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No
Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Appendix 10 – Outfall Discharge Velocity Assessment

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Table A10.1 Salmonid Habitats Details Section 1

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Foyle River (Various Chainages)				S1 OF: 01.1	U	0.65 m/s
				S1 OF: 02.1.A	U	0.65 m/s
				S1 OF PED: 05	U	0.65 m/s
				S1 OF: 02.1.B	U	0.65 m/s
				S1 OF PED: 06	U	0.65 m/s
				S1 OF: 25	U	0.65 m/s
				S1 OF PED: 10A	U	0.65 m/s
				S1 OFS : Victoria Road 2A	U	0.65 m/s
				S1 OF PED: 10	U	0.65 m/s
				S1 OF PED: 11	U	0.65 m/s
New Buildings Stream (Chainage 540m)	RB-33-13B RB-29-13B	S1-PC-01	S1-WD-17	S1 OFS : Victoria Road 1.1	S / N	0.65 m/s
				S1 OF PED: 01	S / N	0.65 m/s
				S1 OF PED: 02	S / N	0.65 m/s
				S1 OF PED: 03	S / N	0.65 m/s
				S1 OF PED: 04	S / N	0.65 m/s
Un-designated Watercourse (UD_01) (Chainage 1,330m)	RB-34-13B RB-21-13B	S1-PC-02	S1-WD-01	S1 OF PED: 07	N/A	HA107/04
				S1 OF PED: 08	N/A	HA107/04
				S1 OF PED: 09	N/A	HA107/04
Gortin Hall Drain (Chainage 2,485m)	RB-06-13B RB-28-13B	S1-PC-03	S1-WD-16	S1 OF: 40	S / N	0.65 m/s
				S1 OF PED: 12	S / N	0.65 m/s
				S1 OF PED: 12A	S / N	0.65 m/s
				S1 OF PED: 13	S / N	0.65 m/s
				S1 OF PED: 14	S / N	0.65 m/s
Un-designated Watercourse (UD_02) (Chainage 3,050m)	RB-07-13B RB-68-15 RB-22-13B	S1-PC-04	S1-WD-02	S1 OF PED: 15	N/A	HA107/04
		S1-PC-32		S1 OF PED: 16	N/A	HA107/04
				S1 OF PED: 16A	N/A	HA107/04
				S1 OF PED: 17	N/A	HA107/04
				S1 OF PED: 18	N/A	HA107/04
				S1 OF PED: 18A	N/A	HA107/04
Blackstone Burn (Chainage 3,375m)	RB-08-13B RB-23-13B	S1-PC-05	S1-WD-03	S1 OF: 26.2	S / N	0.65 m/s
				S1 OF PED: 19	S / N	0.65 m/s
				S1 OF PED: 20	S / N	0.65 m/s
				S1 OF PED: 21	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_04) (Chainage 3,900m)	RB-09-13B RB-14-13B RB-17-13B RB-24-13B	S1-PC-06	S1-WD-05	S1 OF: 05.2	S / N	0.65 m/s
		S1-PC-29		S1 OFS : Dunnalong Road 1.2	S / N	0.65 m/s
		S1-PC-37		S1 OFS : Dunnalong Road 2.1	S / N	0.65 m/s
				S1 OFS : Meenagh Road 2	S / N	0.65 m/s
				S1 OF PED: 22	S / N	0.65 m/s
				S1 OF PED: 23	S / N	0.65 m/s
				S1 OF PED: 23A	S / N	0.65 m/s
				S1 OF PED: 23B	S / N	0.65 m/s
				S1 OF PED: 24	S / N	0.65 m/s
				S1 OF PED: 24A	S / N	0.65 m/s
				S1 OF PED: 25	S / N	0.65 m/s
Un-designated Watercourse (UD_105) (Chainage 5,280m)				S1 OFS : Meenagh Road 1	U	0.65 m/s
				S1 OF PED: 26	U	0.65 m/s
Un-designated Watercourse (UD_05) (Chainage 5,800m)	RB-10-13B RB-20-13B RB-25-13(2)	S1-PC-07	S1-WD-06	S1 OF: 07.2	S / N	0.65 m/s
		S1-PC-41		S1 OFS : Tamnabrady Road.1	S / N	0.65 m/s
				S1 OFS : Cloghboy Road.1	S / N	0.65 m/s
				S1 OF PED: 27	S / N	0.65 m/s
				S1 OF PED: 29	S / N	0.65 m/s
				S1 OF PED: 30	S / N	0.65 m/s
				S1 OF PED: 31	S / N	0.65 m/s
Bready Stream (Chainage 7,600m)				S1 OFS: Bready Cut Accommodation.1	U	0.65 m/s
				S1 OFS : Donagheady Road 2.2	U	0.65 m/s
				S1 OF PED: 28	U	0.65 m/s
				S1 OF PED: 28A	U	0.65 m/s
				S1 OF PED: 32	U	0.65 m/s
				S1 OF PED: 32A	U	0.65 m/s
				S1 OF PED: 32B	U	0.65 m/s
				S1 OF PED: 32C	U	0.65 m/s
				S1 OF PED: 32D	U	0.65 m/s
				S1 OF PED: 32E	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_07) (Chainage 8,240m)	RB-11-13B RB-18-13B RB-26-13B	S1-PC-08	S1-WD-07	S1 OF: 08.1	S / N	0.65 m/s
		S1-PC-38		S1 OF: 10.2	S / N	0.65 m/s
				S1 OF PED: 34	S / N	0.65 m/s
				S1 OF PED: 35	S / N	0.65 m/s
				S1 OF PED: 36	S / N	0.65 m/s
				S1 OF PED: 37	S / N	0.65 m/s
Burndennett River (Chainage 10,500m)	RB-31-13	S1-B06		S1 OF: 11.1	H	HA107/04
				S1 OF: 12.1	S / N	0.65 m/s
				S1 OF: 13.1	N/S	0.65 m/s
				S1 OFS : Drumenny Road.1	H	HA107/04
				S1 OF PED:38	H	HA107/04
				S1 OF PED:39	S	0.65 m/s
				S1 OF PED:40	N/S	0.65 m/s
				S1 OF PED:41	S / N	0.65 m/s
				S1 OF PED:42	S / N	0.65 m/s
				S1 OF PED:43	N/S	0.65 m/s
Ballydonaghy Drain (Chainage 10,900m)	RB-12-13B RB-19-13B RB-27-13B	S1-PC-09	S1-WD-08	S1 OFS : Victoria Road 3.2	N/A	HA107/04
		S1-PC-40		S1 OF PED:44	N/A	HA107/04
				S1 OF PED:45	N/A	HA107/04
				S1 OF PED:46	N/A	HA107/04
				S1 OF PED:47	N/A	HA107/04
Un-designated Watercourse (Chainage 11,250m)				S1 OF PED:47.1	U	0.65 m/s
				S1 OF PED:48	U	0.65 m/s
Un-designated Watercourse (Chainage 11,850m)				S1 OF: 42.1	U	0.65 m/s
				S1 OF PED:49	U	0.65 m/s
				S1 OF PED:50	U	0.65 m/s
				S1 OF PED:51	U	0.65 m/s
Un-designated Watercourse (Chainage 12,400m)				S1 OF PED:52	U	0.65 m/s
				S1 OF PED:53	U	0.65 m/s
Un-designated Watercourse (Chainage 12,600m)	RB-13-13B RB-30-13B	S1-PC-10		S1 OF PED:54	N/A	HA107/04
				S1 OF PED:55	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Glenmornan River (Chainage 12,750m)	RB-32-12	S1-B08		S1 OF: 15.1	S / N	0.65 m/s
				S1 OF: 16.2	S / N	0.65 m/s
Un-designated Watercourse (Chainage 12,850m)				S1 OF PED:56	U	0.65 m/s
				S1 OF PED:57	U	0.65 m/s
Un-designated Watercourse (Chainage 13,100m)				S1 OF PED:58	U	0.65 m/s
				S1 OF PED:59	U	0.65 m/s
Un-designated Watercourse (Chainage 13,300m)				S1 OF PED: 60	U	0.65 m/s
Un-designated Watercourse (Chainage 13,500m)				S1 OF PED: 61	U	0.65 m/s
				S1 OF PED: 61.1	U	0.65 m/s
Ballymagorry Burn (Chainage 13,850m)				S1 OF: 17.1	U	0.65 m/s
				S1 OF PED: 62	U	0.65 m/s
Ballymagorry Burn (Chainage 14,800m)				S1 OF: 27.1	U	0.65 m/s
				S1 OF: 27A	U	0.65 m/s
				S1 OF: 29.1	U	0.65 m/s
				S1 OFS : Spruce Road 1	U	0.65 m/s
				S1 OF PED: 63	U	0.65 m/s
				S1 OF PED: 64	U	0.65 m/s
				S1 OF PED: 65	U	0.65 m/s
				S1 OF PED: 66	U	0.65 m/s
				S1 OF PED: 67	U	0.65 m/s
				S1 OF PED: 67A	U	0.65 m/s
				S1 OF PED: 114	U	0.65 m/s
Strabane Glen Stream (Chainage 15,470m)	RB-61-15	S1-PC-16		S1 OF: 39	S / N	0.65 m/s
				S1 OF PED: 68	S / N	0.65 m/s
				S1 OF PED: 69	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Roundhill Drain (Chainage 15,680m)	RB-58-15	S1-PC-17		S1 OF: 31.1	N/A	HA107/04
				S1 OF PED: 70	N/A	HA107/04
				S1 OF PED: 71	N/A	HA107/04
				S1 OF PED: 72	N/A	HA107/04
				S1 OF PED: 73	N/A	HA107/04
Roundhill Drain 0.01 (Chainage 15,700m)				S1 OF PED: 74	N/A	HA107/04
FD 13.b (Chainage 16,220m)	RB-41-15	S1-PC-18		S1 OF: 32.1	N/A	HA107/04
				S1 OF PED: 75	N/A	HA107/04
				S1 OF PED: 76	N/A	HA107/04
				S1 OF PED: 77	N/A	HA107/04
				S1 OF PED: 78	N/A	HA107/04
Backfence Drain (Chainage 16,650m)	RB-39-15	S1-PC-19		S1 OF PED: 79	N/A	HA107/04
				S1 OF PED: 79.1	N/A	HA107/04
Nancy Burn (Chainage 17,090m)	RB-51-15	S1-PC-20A		S1 OF: 33.1	N/A	HA107/04
	RB-53-15	S1-PC-20B		S1 OF: 34.1	N/A	HA107/04
	RB-54-15	S1-PC-20C		S1 OF PED: 80	N/A	HA107/04
	RB-55-15	S1-PC-33		S1 OF PED: 80.1	N/A	HA107/04
	RB-56-15	S1-PC-42		S1 OF PED: 81	N/A	HA107/04
Park Road Drain (Chainage 17,380m)	RB-57-15	S1-PC-22		S1 OFS : Park Road 1	N/A	HA107/04
				S1 OFS : Park Road 3	N/A	HA107/04
				S1 OF PED: 82	N/A	HA107/04
				S1 OF PED: 83	N/A	HA107/04
				S1 OF PED: 84	N/A	HA107/04
Mourne River (Chainage 17,900m)				S1 OFS : Lifford Road.1	H	HA107/04
				S1 OFS : Great Northern Link.1	H	HA107/04
				S1 OF PED: 85	H	HA107/04
				S1 OF PED: 86	H	HA107/04
				S1 OF PED: 87	H	HA107/04
UD_08 (Chainage 18,180m)	RB-70-15	S1-PC-23	S1-WD-18	S1 OF PED: 88	N/A	HA107/04
	RB-69-15			S1 OF PED: 88A	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
River Finn (Various Chainages)				S1 OF: 36.1	U	0.65 m/s
				S1 OF: 37.1	U	0.65 m/s
				S1 OF: 41	U	0.65 m/s
				S1 OF: 22.2	U	0.65 m/s
				S1 OFS : Strahans Road 1.1	U	0.65 m/s
				S1 OF PED: 89	U	0.65 m/s
				S1 OF PED: 90	U	0.65 m/s
				S1 OF PED: 93	U	0.65 m/s
				S1 OF PED: 94	U	0.65 m/s
				S1 OF PED: 98	U	0.65 m/s
				S1 OF PED: 99	U	0.65 m/s
Urney Road Drain (Chainage 18,720m)	RB-134-15 RB-135-15	S1-PC-24	S1-WD-14	S1 OF PED: 91	N/A	HA107/04
				S1 OF PED: 92	N/A	HA107/04
UD_10 (Chainage 19,230m)	RB-71-15	S1-PC-25		S1 OFS : Urney Road 2.1	U	0.65 m/s
				S1 OF PED: 95	U	0.65 m/s
				S1 OF PED: 96	U	0.65 m/s
				S1 OF PED: 97	U	0.65 m/s
				S1 OF PED: 110	U	0.65 m/s
				S1 OF PED: 111	U	0.65 m/s
Flushtown (Chainage 20,900m)	RB-45-15	S1-PC-27		S1 OF: 23.1	S / N	0.65 m/s
				S1 OF: 38	S / N	0.65 m/s
				S1 OFS : Knockroe Road 2	S / N	0.65 m/s
				S1 OFS : Orchard Road .1	S / N	0.65 m/s
				S1 OF PED: 101	S / N	0.65 m/s
				S1 OF PED: 102	S / N	0.65 m/s
				S1 OF PED: 103	S / N	0.65 m/s
				S1 OF PED: 104	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
UD_12 (Chainage 21,990m)	RB-72-15 RB-73-15	S1-PC-28	S1-WD-19	S1 OF: 24.1	S / N	0.65 m/s
				S1 OFS : Melmont Road 1.1	S / N	0.65 m/s
				S1 OFS : Melmont Road 2.2	S / N	0.65 m/s
				S1 OFS : Melmont Road 4	S / N	0.65 m/s
				S1 OF PED: 100	S / N	0.65 m/s
				S1 OF PED: 106	S / N	0.65 m/s
				S1 OF PED: 107	S / N	0.65 m/s
				S1 OF PED: 108	S / N	0.65 m/s
				S1 OF PED: 109	S / N	0.65 m/s
				S1 OF PED: 112	S / N	0.65 m/s
				S1 OF PED: 113	S / N	0.65 m/s
Undesignated Watercourse (Chainage 22,800m)				S1 OF PED: 105	U	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Table A10.2 Salmonid Habitats Details Section 2

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_13.1) (Chainage 28,100m)	RB-74-15	S2-PC-54		S2 OF: 1	N/A	HA107/04
				S2 OFS : Bells Park Road 1.1	N/A	HA107/04
				S2 OFS : Bells Park Road 2.1	N/A	HA107/04
				S2 OFS : Bells Park Road 3	N/A	HA107/04
				S2 OFS : Garden Road	N/A	HA107/04
				S2 PED OF: 2.1	N/A	HA107/04
				S2 PED OF: 2.2	N/A	HA107/04
				S2 PED OF: 2.3	N/A	HA107/04
				S2 PED OF: 2.4	N/A	HA107/04
				S2 PED OF: 2.5	N/A	HA107/04
				S2 PED OF: 2.6	N/A	HA107/04
Un-designated Watercourse (UD_15) (Chainage 29,800m)	RB-74-15 RB-75-15 RB-76-15	S2-PC-01	S1-WD-01	S2 OF: 2	S / N	0.65 m/s
			S2-WD-43	S2 OFS : Seein Road 1	S / N	0.65 m/s
				S2 OFS : Seein Road 2.1	S / N	0.65 m/s
				S2 PED OF: 5	S / N	0.65 m/s
				S2 PED OF: 6	S / N	0.65 m/s
				S2 PED OF: 7	S / N	0.65 m/s
				S2 PED OF: 4	S / N	0.65 m/s
Un-designated Watercourse (UD_16) (Chainage 30,150m)	RB-78-15 RB-79-15 RB-80-15 RB-81-05	S2-PC-48		S2 OFS : Concess Road	N/A	HA107/04
		S2-PC-55		S2 PED OF: 8	N/A	HA107/04
		S2-PC-56		S2 PED OF: 9	N/A	HA107/04
		S2-PC-58		S2 PED OF: 9.1	N/A	HA107/04
				S2 PED OF: 10	N/A	HA107/04
Un-designated Watercourse (UD_17) (Chainage 30,820m)	RB-82-15	S2-PC-02		S2 OF: 3	S / N	0.65 m/s
				S2 PED OF: 11	S / N	0.65 m/s
				S2 PED OF: 11.1	S / N	0.65 m/s
				S2 PED OF: 12	S / N	0.65 m/s
				S2 PED OF: 13	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_19) (Chainage 31,500m)	RB-83-15 RB-84-15 RB-85-15	S2-PC-03 S2-PC-49	S2-WD-33	S2 OF: 4	S / N	0.65 m/s
				S2 OFS : Stone Road 1	S / N	0.65 m/s
				S2 OFS : Stone Road 2	S / N	0.65 m/s
				S2 OFS : Urbalreagh Road	S / N	0.65 m/s
				S2 PED OF: 15	S / N	0.65 m/s
				S2 PED OF: 16.1	S / N	0.65 m/s
				S2 PED OF: 17.1	S / N	0.65 m/s
				S2 PED OF: 18	S / N	0.65 m/s
				S2 PED OF: 19	S / N	0.65 m/s
				S2 PED OF: 19.1	S / N	0.65 m/s
				S2 PED OF: 19.2	S / N	0.65 m/s
Un-designated Watercourse (Chainage 32,300m)				S2 PED OF: 20	U	0.65 m/s
				S2 PED OF: 20.1	U	0.65 m/s
Derg River (Chainage 34,300m)				S2 OF: 5	H	HA107/04
				S2 OF: 6	S	0.65 m/s
				S2 OFS : Derg Road 1	H	HA107/04
				S2 OFS : Deerpark Road 1	H	HA107/04
				S2 OFS : Deerpark Road 2	U	0.65 m/s
				S2 PED OF: 21	H	HA107/04
				S2 PED OF: 21.1	U	0.65 m/s
				S2 PED OF: 21.2	U	0.65 m/s
				S2 PED OF: 22	N	0.65 m/s
				S2 PED OF: 22.1	N	0.65 m/s
				S2 PED OF: 22.2	N	0.65 m/s
				S2 PED OF: 23	S	0.65 m/s
				S2 PED OF: 23.1	S	0.65 m/s
				S2 PED OF: 24	U	0.65 m/s
Coolaghy Burn (Chainage 36,400m)				S2 OF: 8.1	U	0.65 m/s
				S2 OFS : Maghercolton Road 0.1	U	0.65 m/s
				S2 OFS : Drumlegagh Road 1.1	U	0.65 m/s
				S2 OFS : Drumlegagh Road 2	U	0.65 m/s
				S2 OFS : Baronscourt Road 1.1	U	0.65 m/s
				S2 PED OF: 25	U	0.65 m/s
				S2 PED OF: 25.1	U	0.65 m/s
				S2 PED OF: 26	U	0.65 m/s
				S2 PED OF: 26.1	U	0.65 m/s
				S2 PED OF: 27	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Scotts Mill Layde (Chainage 37,500m)	RB-59-15 RB-60-16	S2-PC-07	S2-WD-05	S2 OF: 9	N/A	HA107/04
				S2 OFS : Baronscourt Road 2.1	N/A	HA107/04
				S2 PED OF: 28	N/A	HA107/04
				S2 PED OF: 29	N/A	HA107/04
				S2 PED OF: 30	N/A	HA107/04
				S2 PED OF: 30.1	N/A	HA107/04
				S2 PED OF: 31	N/A	HA107/04
Un-designated Watercourse (UD_21) (Chainage 38,250m)	RB-86-15	S2-PC-08	S2-WD-34	S2 OFS : Oldcastle Road 1	N/A	HA107/04
				S2 OFS : Oldcastle Road 2.1	N/A	HA107/04
				S2 PED OF: 32	N/A	HA107/04
				S2 PED OF: 32.1	N/A	HA107/04
				S2 PED OF: 33	N/A	HA107/04
				S2 PED OF: 33.1	N/A	HA107/04
Back Burn (UD_22) (Chainage 39,250m)	RB-88-15 RB-89-15	S2-PC-09		S2 OF: 10	S / N	0.65 m/s
		S2-PC-60		S2 OFS : Castletown Road 1	S / N	0.65 m/s
				S2 OFS : Glen Road 1	S / N	0.65 m/s
				S2 OFS : Glen Road 2.2	S / N	0.65 m/s
				S2 OFS : Glen Road 3	S / N	0.65 m/s
				S2 PED OF: 34	S / N	0.65 m/s
				S2 PED OF: 34.1	S / N	0.65 m/s
				S2 PED OF: 35	S / N	0.65 m/s
Un-designated Watercourse (UD_23.2) (Chainage 40,330m)				S2 OFS : Castletown Road 2	S / N	0.65 m/s
				S2 PED OF: 37	S / N	0.65 m/s
Un-designated Watercourse (UD_23) (Chainage 40,600m)	RB-90-15 RB-91-15	S2-PC-10	S2-WD-08	S2 OF: 33	S / N	0.65 m/s
				S2 OFS : Grange Road	S / N	0.65 m/s
				S2 PED OF: 38	S / N	0.65 m/s
				S2 PED OF: 39	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_24) (Chainage 41,250m)	RB-92-15	S2-PC-11		S2 OF: 34	N/A	HA107/04
				S2 OFS : West Road	N/A	HA107/04
				S2 PED OF: 41	N/A	HA107/04
				S2 PED OF: 41.1	N/A	HA107/04
				S2 PED OF: 42	N/A	HA107/04
				S2 PED OF: 43	N/A	HA107/04
Un-designated Watercourse (UD_25) (Chainage 41,590m)	RB-93-15		S2-WD-35	S2 PED OF: 45.1	N/A	HA107/04
Un-designated Watercourse (UD_26) (Chainage 41,850m)	RB-94-15 RB-95-15	S2-PC-12	S2-WD-09	S2 OF: 11	S / N	0.65 m/s
				S2 PED OF: 45	S / N	0.65 m/s
				S2 PED OF: 46	S / N	0.65 m/s
				S2 PED OF: 47	S / N	0.65 m/s
Un-designated Watercourse (UD_28) (Chainage 42,600m)	RB-96-15 RB-97-15	S2-PC-13	S2-WD-10	S2 OFS : Joes Lane 1	S / N	0.65 m/s
				S2 OFS : Joes Lane 2	S / N	0.65 m/s
				S2 PED OF: 48	S / N	0.65 m/s
				S2 PED OF: 48.1	S / N	0.65 m/s
				S2 PED OF: 49	S / N	0.65 m/s
				S2 PED OF: 49.1	S / N	0.65 m/s
				S2 PED OF: 50	S / N	0.65 m/s
Un-designated Watercourse (UD_29) (Chainage 42,850m)	RB-98-15 RB-99-15	S2-PC-14	S2-WD-36	S2 PED OF: 51	S / N	0.65 m/s
				S2 PED OF: 51.1	S / N	0.65 m/s
				S2 PED OF: 52	S / N	0.65 m/s
				S2 PED OF: 52.1	S / N	0.65 m/s
Un-designated Watercourse (Chainage 43,000m)				S2 PED OF: 53	U	0.65 m/s
				S2 PED OF: 53.1	U	0.65 m/s
Un-designated Watercourse (UD_31) (Chainage 43,150m)	RB-100-15 RB-101-15	S2-PC-16	S2-WD-41	S2 PED OF: 54	S / N	0.65 m/s
				S2 PED OF: 54.1	S / N	0.65 m/s
				S2 PED OF: 55	S / N	0.65 m/s
				S2 PED OF: 55.1	S / N	0.65 m/s
Un-designated Watercourse (UD_32) (Chainage 43,370m)	RB-102-15 RB-103-15	S2-PC-17	S2-WD-42	S2 PED OF: 57	S / N	0.65 m/s
				S2 PED OF: 57.1	S / N	0.65 m/s
				S2 PED OF: 58	S / N	0.65 m/s
				S2 PED OF: 58.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_33) (Chainage 43,780m)	RB-105-15 RB-104-15	S2-PC-18	S2-WD-37	S2 OF: 13	S / N	0.65 m/s
				S2 PED OF: 61.1	S / N	0.65 m/s
				S2 PED OF: 61.2	S / N	0.65 m/s
				S2 PED OF: 62.1	S / N	0.65 m/s
				S2 PED OF: 62.2	S / N	0.65 m/s
Un-designated Watercourse (UD_34) (Chainage 43,950m)	RB-106-15 RB-107-15	S2-PC-19	S2-WD-38	S2 OF: 35	N/A	HA107/04
				S2 PED OF: 63.1	N/A	HA107/04
				S2 PED OF: 63.2	N/A	HA107/04
				S2 PED OF: 64.1	N/A	HA107/04
				S2 PED OF: 64.2	N/A	HA107/04
Un-designated Watercourse (UD_35a, 35.1) (Chainage 44,200m)	RB-108-15 RB-109-15	S2-PC-50	S2-WD-11	S2 PED OF: 65	S / N	0.65 m/s
				S2 PED OF: 65.2	S / N	0.65 m/s
				S2 PED OF: 65.3	S / N	0.65 m/s
Un-designated Watercourse (UD_36) (Chainage 44,500m)	RB-82-15	S2-PC-20	S2-WD-13	S2 OF: 39	S / N	0.65 m/s
				S2 OFS : Killinure Road 1.1	S / N	0.65 m/s
				S2 OFS : Killinure Road 2	S / N	0.65 m/s
				S2 PED OF: 65.1	S / N	0.65 m/s
				S2 PED OF: 66	S / N	0.65 m/s
				S2 PED OF: 66.1	S / N	0.65 m/s
Un-designated Watercourse (UD_37) (Chainage 46,200m)	RB-112-15	S2-PC-21	S2-WD-14	S2 OF: 18	N/A	HA107/04
				S2 OFS : Castletown Road 1A 0.1	N/A	HA107/04
				S2 PED OF: 67	N/A	HA107/04
				S2 PED OF: 67.1	N/A	HA107/04
				S2 PED OF: 70	N/A	HA107/04
				S2 PED OF: 71	N/A	HA107/04
Un-designated Watercourse (UD_38) (Chainage 46,440m)	RB-114-15		S2-WD-15	S2 PED OF: 72	S / N	0.65 m/s
				S2 PED OF: 72.1	S / N	0.65 m/s
Un-designated Watercourse (UD_39) (Chainage 46,440m)	RB-115-15	S2-PC-22		S2 PED OF: 73	S / N	0.65 m/s
				S2 PED OF: 74.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_40 / UD_41 / UD_42 / 43.1) (Chainage 47,300m)	RB-117-15	S2-PC-47	S2-WD-16	S2 OF: 19	S / N	0.65 m/s
	RB-116-15	S2-PC-59	S2-WD-18	S2 OFS : Dunteige Road 1	S / N	0.65 m/s
	RB-118-15			S2 OFS : Dunteige Road 2.1	S / N	0.65 m/s
	RB-119-15			S2 PED OF: 74	S / N	0.65 m/s
				S2 PED OF: 75	S / N	0.65 m/s
				S2 PED OF: 76	S / N	0.65 m/s
				S2 PED OF: 77	S / N	0.65 m/s
				S2 PED OF: 78	S / N	0.65 m/s
				S2 PED OF: 78.1	S / N	0.65 m/s
Un-designated Watercourse (UD_44) (Chainage 48,150m)				S2 OFS : Rash Road 1.1	U	0.65 m/s
				S2 PED OF: 80	U	0.65 m/s
				S2 PED OF: 80.1	U	0.65 m/s
Un-designated Watercourse (UD_45) (Chainage 48,890m)	RB-120-15	S2-PC-26	S2-WD-19	S2 PED OF: 81	U	0.65 m/s
	RB-121-15			S2 PED OF: 81.1	U	0.65 m/s
				S2 PED OF: 83	U	0.65 m/s
				S2 PED OF: 83.1	U	0.65 m/s
Tully Drain (Chainage 48,950m)	RB-62-15	S2-PC-27	S2-WD-39	S2 OF: 21.1	S / N	0.65 m/s
	RB-66-15	S2-PC-28	S2-WD-20	S2 OF: 22	S / N	0.65 m/s
	RB-64-15	S2-PC-53		S2 OFS : Rash Road 2	S / N	0.65 m/s
	RB-63-15			S2 OFS : Rash Road 3	S / N	0.65 m/s
	RB-65-15			S2 OFS : Drumleagh Road	S / N	0.65 m/s
				S2 OFS :Beltany Road 1	S / N	0.65 m/s
				S2 OFS :Beltany Road 2.1	S / N	0.65 m/s
				S2 PED OF: 85	S / N	0.65 m/s
				S2 PED OF: 86.1	S / N	0.65 m/s
				S2 PED OF: 87	S / N	0.65 m/s
				S2 PED OF: 88	S / N	0.65 m/s
				S2 PED OF: 89	S / N	0.65 m/s
Fairy Water (Chainage 50,135m)	RB-40-15		S2-WD-21	S2 OF: 23.1	U	0.65 m/s
				S2 OF: 41.1	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.1	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.2	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.3	U	0.65 m/s
				S2 PED OF: 90	U	0.65 m/s
				S2 PED OF: 90.1	U	0.65 m/s
				S2 PED OF: 92	U	0.65 m/s
				S2 PED OF: 93	U	0.65 m/s
				S2 PED OF: 93.1	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Aghnamoyle Drain (Chainage 51,025m)	RB-38-15	S2-PC-29		S2 OF: 24	N/A	HA107/04
				S2 OF: 25.1	N/A	HA107/04
				S2 OFS :Gillygooley Road 1.1	N/A	HA107/04
				S2 OFS :Aghnamoyle Road	N/A	HA107/04
				S2 PED OF: 95	N/A	HA107/04
				S2 PED OF: 95.1	N/A	HA107/04
				S2 PED OF: 96	N/A	HA107/04
				S2 PED OF: 97	N/A	HA107/04
				S2 PED OF: 98	N/A	HA107/04
				S2 PED OF: 99	N/A	HA107/04
Un-designated Watercourse (UD_50) (Chainage 52,700m)	RB-120-15		S2-WD-25	S2 PED OF: 100	S / N	0.65 m/s
				S2 PED OF: 101	S / N	0.65 m/s
Un-designated Watercourse (UD_52) (Chainage 53,200m)	RB-123-15 RB-124-15	S2-PC-32	S2-WD-40	S2 OFS :Tamlaght Road 1	S / N	0.65 m/s
				S2 PED OF: 102	S / N	0.65 m/s
				S2 PED OF: 104	S / N	0.65 m/s
				S2 PED OF: 105	S / N	0.65 m/s
				S2 PED OF: 105.1	S / N	0.65 m/s
Un-designated Watercourse (Chainage 53,350m)				S2 PED OF: 106	U	0.65 m/s
				S2 PED OF: 106.1	U	0.65 m/s
				S2 PED OF: 107	U	0.65 m/s
Un-designated Watercourse (UD_54) (Chainage 53,700m)	RB-125-15 RB-126-15 RB-127-15	S2-PC-34	S2-WD-26	S2 OFS :Brookmount Road	S / N	0.65 m/s
		S2-PC-51		S2 PED OF: 108	S / N	0.65 m/s
				S2 PED OF: 109	S / N	0.65 m/s
				S2 PED OF: 109.2	S / N	0.65 m/s
Fireagh Drain (Chainage 53,900m)	RB-43-15 RB-44-15 RB-42-15	S2-PC-36	S2-WD-27	S2 OF: 27	S / N	0.65 m/s
		S2-PC-57		S2 OF: 29	S / N	0.65 m/s
				S2 OFS :Clanabogan Road 1	S / N	0.65 m/s
				S2 OFS :Clanabogan Road 2	S / N	0.65 m/s
				S2 PED OF: 111	S / N	0.65 m/s
				S2 PED OF: 112	S / N	0.65 m/s
				S2 PED OF: 113	S / N	0.65 m/s
				S2 PED OF: 113.1	S / N	0.65 m/s
Un-designated Watercourse (UD_55) (Chainage 54,320m)	RB-129-15 RB-128-15	S2-PC-38	S2-WD-28	S2 OFS :Loughmuck Road	N/A	HA107/04
				S2 PED OF: 114	N/A	HA107/04
				S2 PED OF: 115	N/A	HA107/04
				S2 PED OF: 115.1	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (Chainage 55,000m)				S2 PED OF: 116	S / N	0.65 m/s
Un-designated Watercourse (UD_56) (Chainage 55,250m)	RB-130-15 RB-131-15	S2-PC-39	S2-WD-29	S2 OF: 37	N/A	HA107/04
				S2 PED OF: 117	N/A	HA107/04
				S2 PED OF: 117.1	N/A	HA107/04
				S2 PED OF: 118	N/A	HA107/04
Loughmuck (Chainage 56,000m)	RB-50-15 RB-48-15 RB-49-15	S2-PC-43	S2-WD-30	S2 OF: 38.1	N/A	HA107/04
		S2-PC-44		S2 OFS :Beagh Road 1	N/A	HA107/04
				S2 OFS :Beagh Road 2	N/A	HA107/04
				S2 OFS :Ballynahatty Road 2	N/A	HA107/04
				S2 PED OF: 119	N/A	HA107/04
				S2 PED OF: 121	N/A	HA107/04
				S2 PED OF: 122	N/A	HA107/04
				S2 PED OF: 122.1	N/A	HA107/04
				S2 PED OF: 123	N/A	HA107/04
				S2 PED OF: 123.1	N/A	HA107/04
				S2 PED OF: 124	N/A	HA107/04
				S2 PED OF: 124.1	N/A	HA107/04
				S2 PED OF: 125	N/A	HA107/04
				S2 PED OF: 125.1	N/A	HA107/04
Drumragh (Chainage 56,580m)				S2 OF: 30	N	0.65 m/s
				S2 OF: 31.1	N	0.65 m/s
				S2 OFS :Ballynahatty Road 1	H	HA107/04
				S2 PED OF: 126	H	HA107/04
				S2 PED OF: 127	H	HA107/04
Un-designated Watercourse (UD_57) (Chainage 56,900m)				S2 OFS :Blackfort Road 1	U	0.65 m/s
				S2 PED OF: 128	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Freughmore Drain (Chainage 57,300m)	RB-46-15 RB-47-15	S2-PC-45	S2-WD-31	S2 OF: 32	S / N	0.65 m/s
				S2 OFS :Blackfort Road 2	S / N	0.65 m/s
				S2 OFS :Drumragh Road	S / N	0.65 m/s
				S2 PED OF: 130	S / N	0.65 m/s
				S2 PED OF: 130.1	S / N	0.65 m/s
				S2 PED OF: 131	S / N	0.65 m/s
				S2 PED OF: 132	S / N	0.65 m/s
				S2 PED OF: 133	S / N	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Table A10.3 Salmonid Habitats Details Section 3

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Drumragh (Chainage 61,800m)				S3 OFS : Seskinore Road 1	N	0.65 m/s
				S3 PED OF: 01.1	N	0.65 m/s
				S3 PED OF: 01.4	N	0.65 m/s
Un-designated Watercourse (UD_57.2, UD_57.3) (Chainage 61,850m)	RB-132-15 RB-133-15 RB-44b-13 RB-44-13	S3-PC-56	S3-WD-32	S3 OFS : Seskinore Road 2.2	S / N	0.65 m/s
		S3-PC-84	S3-WD-66	S3 PED OF: 01	S / N	0.65 m/s
				S3 PED OF: 01.2	S / N	0.65 m/s
				S3 PED OF: 01.3	S / N	0.65 m/s
				S3 PED OF: 01.5	S / N	0.65 m/s
				S3 PED OF: 01.6	S / N	0.65 m/s
				S3 PED OF: 01.7	S / N	0.65 m/s
				S3 PED OF: 01.8	S / N	0.65 m/s
				S3 PED OF: 02	S / N	0.65 m/s
				S3 PED OF: 02.1	S / N	0.65 m/s
Un-designated Watercourse (UD_58, UD_108) (Chainage 62,550m)	RB-40b-13B RB-40-13 RB-40c-13B RB-73-13B	S3-PC-51	S3-WD-43	S3 OF: 21	N/A	HA107/04
			S3-WD-44	S3 OFS : Doogary Road 1	N/A	HA107/04
			S3-WD-70	S3 OFS : Doogary Road 2	N/A	HA107/04
				S3 PED OF: 03	N/A	HA107/04
				S3 PED OF: 03.1	N/A	HA107/04
				S3 PED OF: 03.2	N/A	HA107/04
				S3 PED OF: 03.3	N/A	HA107/04
				S3 PED OF: 03.4	N/A	HA107/04
				S3 PED OF: 04	N/A	HA107/04
				S3 PED OF: 04.1	N/A	HA107/04
				S3 PED OF: 04.2	N/A	HA107/04
				S3 PED OF: 05	N/A	HA107/04
Un-designated Watercourse (UD_109) (Chainage 64,080m)	RB-41-13B RB-41b-13B	S3-PC-52	S3-WD-45	S3 PED OF: 07	S / N	0.65 m/s
				S3 PED OF: 07.1	S / N	0.65 m/s
				S3 PED OF: 08	S / N	0.65 m/s
				S3 PED OF: 08.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Ranelly Drain 0.5 (Chainage 64,390m)	RB-42-13B RB-50-13B RB-89-13B RB-42-13B	S3-PC-53 S3-PC-74 S3-PC-82	S3-WD-46	S3 OF: 2.1	S / N	0.65 m/s
				S3 OFS : Drumconnelly Road.2	S / N	0.65 m/s
				S3 OFS : Drumconnelly Road 2	S / N	0.65 m/s
				S3 PED OF: 09	S / N	0.65 m/s
				S3 PED OF: 09.1	S / N	0.65 m/s
				S3 PED OF: 10	S / N	0.65 m/s
				S3 PED OF: 11	S / N	0.65 m/s
				S3 PED OF: 11.1	S / N	0.65 m/s
				S3 PED OF: 11.2	S / N	0.65 m/s
				S3 PED OF: 11.3	S / N	0.65 m/s
				S3 PED OF: 11.4	S / N	0.65 m/s
				S3 PED OF: 11.5	S / N	0.65 m/s
				S3 PED OF: 11.6	S / N	0.65 m/s
				S3 PED OF: 12	S / N	0.65 m/s
Ranelly Drain (Ranelly Drain 1, Ranelly Drain 1.1, UD_119) (Chainage 64,980m)	RB-52-13B RB-52c-13B RB-52b-13B	S3-PC-06	S3-WD-04	S3 OF: 22.2	S / N	0.65 m/s
			S3-WD-05	S3 PED OF: 13	S / N	0.65 m/s
				S3 PED OF: 13.1	S / N	0.65 m/s
				S3 PED OF: 13.2	S / N	0.65 m/s
Ranelly Drain (Ranelly Drain 2, Ranelly Drain 2.1, Ranelly Drain 2.3, Ranelly Drain 3, Ranelly Drain 3.1) (Chainage 65,650m)	RB-53-13B RB-54-13B RB-55-13B RB-53b-13B RB-54b-13B RB-54c-13B RB-55b-13B RB-69-13B	S3-PC-07 S3-PC-08 S3-PC-10	S3-WD-06	S3 OF: 3.3	S / N	0.65 m/s
			S3-WD-07	S3 OFS : Tullyrush Road Lane 1	S / N	0.65 m/s
			S3-WD-08	S3 OFS : Tullyrush Road Lane 2.3	S / N	0.65 m/s
			S3-WD-09	S3 PED OF: 14	S / N	0.65 m/s
			S3-WD-10	S3 PED OF: 15	S / N	0.65 m/s
				S3 PED OF: 15.1	S / N	0.65 m/s
				S3 PED OF: 16	S / N	0.65 m/s
				S3 PED OF: 16.1	S / N	0.65 m/s
				S3 PED OF: 16.2	S / N	0.65 m/s
				S3 PED OF: 18	S / N	0.65 m/s
Un-designated Watercourse (UD_60) (Chainage 66,870m)	RB-56-13B RB-56b-13	S3-PC-11	S3-WD-75	S3 OF: 4.1	N/A	HA107/04
				S3 OFS : Rarone Road 1	N/A	HA107/04
				S3 OFS : Rarone Road 2.1	N/A	HA107/04
				S3 OFS : Rarone Road 3	N/A	HA107/04
				S3 OFS : Rarone Road 4	N/A	HA107/04
				S3 PED OF: 20	N/A	HA107/04
				S3 PED OF: 20.1	N/A	HA107/04
				S3 PED OF: 20.2	N/A	HA107/04
				S3 PED OF: 20.3	N/A	HA107/04
				S3 PED OF: 20.4	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_61) (Chainage 67,650m)	RB-57-13B RB-57b-13B	S3-PC-12	S3-WD-11	S3 OFS : Drumconnelly Road 4	S / N	0.65 m/s
				S3 PED OF: 21	S / N	0.65 m/s
				S3 PED OF: 21.1	S / N	0.65 m/s
				S3 PED OF: 22	S / N	0.65 m/s
				S3 PED OF: 23	S / N	0.65 m/s
				S3 PED OF: 23.1	S / N	0.65 m/s
Letfern (UD_61.2) (Chainage 68,650m)	RB-58-13B	S3-PC-14	S3-WD-12	S3 OF: 5.1	S / N	0.65 m/s
	RB-59-13B	S3-PC-15	S3-WD-47	S3 OFS : Moylagh Road 1	S / N	0.65 m/s
	RB-45-13	S3-PC-58	S3-WD-48	S3 OFS : Moylagh Road 2	S / N	0.65 m/s
	RB-59b-13B	S3-PC-66		S3 PED OF: 24	S / N	0.65 m/s
	RB-58b-13B			S3 PED OF: 24.1	S / N	0.65 m/s
	RB-58c-13B			S3 PED OF: 25	S / N	0.65 m/s
				S3 PED OF: 26	S / N	0.65 m/s
				S3 PED OF: 27.1	S / N	0.65 m/s
				S3 PED OF: 27.2	S / N	0.65 m/s
				S3 PED OF: 28	S / N	0.65 m/s
				S3 PED OF: 28.1	S / N	0.65 m/s
Un-designated Watercourse (UD_62 / UD_63) (Chainage 69,700m)	RB-60-13B	S3-PC-16	S3-WD-13	S3 PED OF: 29	N/A	HA107/04
	RB-61-13B	S3-PC-17	S3-WD-14	S3 PED OF: 31	N/A	HA107/04
	RB-60b-13B			S3 PED OF: 31.1	N/A	HA107/04
	RB-61b-13B			S3 PED OF: 33	N/A	HA107/04
				S3 PED OF: 33.1	N/A	HA107/04
				S3 PED OF: 34	N/A	HA107/04
Un-designated Watercourse (UD_65 / UD_66) (Chainage 70,200m)	RB-62-13	S3-PC-18	S3-WD-16	S3 OF: 6.1	N/A	HA107/04
	RB-62b-13B		S3-WD-17	S3 PED OF: 35	N/A	HA107/04
	RB-70-13B			S3 PED OF: 36	N/A	HA107/04
				S3 PED OF: 36.1	N/A	HA107/04
				S3 PED OF: 37	N/A	HA107/04
				S3 PED OF: 38	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_67, UD_67A) (Chainage 71,100m)	RB-35B-13B RB-35B-13B RB-35B-13B RB-39-13 RB-51-13	S3-PC-19	S3-WD-18	S3 OF: 23.1	S / N	0.65 m/s
		S3-PC-50	S3-WD-19	S3 OFS : Greenmount Road	S / N	0.65 m/s
		S3-PC-83		S3 OFS : Greenmount Road Lane.1	S / N	0.65 m/s
				S3 OFS : Greenmount Road Lane 2	S / N	0.65 m/s
				S3 PED OF: 39	S / N	0.65 m/s
				S3 PED OF: 40	S / N	0.65 m/s
				S3 PED OF: 41	S / N	0.65 m/s
				S3 PED OF: 42	S / N	0.65 m/s
				S3 PED OF: 42.1	S / N	0.65 m/s
				S3 PED OF: 43	S / N	0.65 m/s
				S3 PED OF: 44	S / N	0.65 m/s
				S3 PED OF: 45	S / N	0.65 m/s
Routing Burn (Chainage 71,700m)				S3 OF: 7	H	HA107/04
				S3 OFS : Routing Burn Lane 1	H	HA107/04
				S3 OFS : Routing Burn Lane 2.1	H	HA107/04
				S3 PED OF: 46	H	HA107/04
				S3 PED OF: 47	H	HA107/04
Un-designated Watercourse (UD_68) (Chainage 72,090m)	RB-36-13B RB-36b-13B	S3-PC-21	S3-WD-20	S3 PED OF: 51	S / N	0.65 m/s
				S3 PED OF: 51.1	S / N	0.65 m/s
				S3 PED OF: 51.2	S / N	0.65 m/s
Un-designated Watercourse (UD_69) (Chainage 72,380m)	RB-37-13B RB-37b-13B	S3-PC-22	S3-WD-21	S3 OF: 24.1	S / N	0.65 m/s
				S3 PED OF: 52	S / N	0.65 m/s
				S3 PED OF: 52.1	S / N	0.65 m/s
				S3 PED OF: 52.2	S / N	0.65 m/s
				S3 PED OF: 53	S / N	0.65 m/s
				S3 PED OF: 54	S / N	0.65 m/s
Un-designated Watercourse (UD_70) (Chainage 73,000m)	RB-71-13B		S3-WD-22	S3 PED OF: 55	S / N	0.65 m/s
				S3 PED OF: 56	S / N	0.65 m/s
				S3 PED OF: 57	S / N	0.65 m/s
Un-designated Watercourse (UD_71) (Chainage 73,770m)	RB-38-13B RB-38b-13B	S3-PC-23	S3-WD-49	S3 OF: 8.1	S / N	0.65 m/s
				S3 OFS : Springhill Road	S / N	0.65 m/s
				S3 PED OF: 58	S / N	0.65 m/s
				S3 PED OF: 58.1	S / N	0.65 m/s
				S3 PED OF: 59	S / N	0.65 m/s
Un-designated Watercourse (UD_72, UD_72.2) (Chainage 74,100m)	RB-47-13B RB-48-13B	S3-PC-64		S3 PED OF: 60	S / N	0.65 m/s
		S3-PC-65				

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_110, UD_110.1, UD_110.2, UD_110.3) (Chainage 74,900m)	RB-43-13B	S3-PC-54	S3-WD-50	S3 OF: 9.1	S / N	0.65 m/s
	RB-46-13B	S3-PC-60	S3-WD-51	S3 OF: 10	S / N	0.65 m/s
	RB-49-13B	S3-PC-72		S3 OFS : Tullanafoile Road	S / N	0.65 m/s
	RB-43b-13B			S3 OFS : Tullanafoile Road 2	S / N	0.65 m/s
	RB-49b-13B			S3 PED OF: 61	S / N	0.65 m/s
				S3 PED OF: 61.1	S / N	0.65 m/s
				S3 PED OF: 62	S / N	0.65 m/s
				S3 PED OF: 63	S / N	0.65 m/s
				S3 PED OF: 64	S / N	0.65 m/s
				S3 PED OF: 64.1	S / N	0.65 m/s
				S3 PED OF: 65	S / N	0.65 m/s
				S3 PED OF: 65.1	S / N	0.65 m/s
				S3 PED OF: 66	S / N	0.65 m/s
Un-designated Watercourse (UD_75, UD_75.3, UD_113.1) (Chainage 77,000m)		S3-PC-55	S3-WD-53	S3 OFS : Tycanny Road 2.1	S / N	0.65 m/s
			S3-WD-54	S3 OFS : Tycanny Road 3	S / N	0.65 m/s
				S3 PED OF: 66.1	S / N	0.65 m/s
				S3 PED OF: 66.2	S / N	0.65 m/s
				S3 PED OF: 67	S / N	0.65 m/s
				S3 PED OF: 68	S / N	0.65 m/s
				S3 PED OF: 68.1	S / N	0.65 m/s
Un-designated Watercourse (UD_76, UD_78) (Chainage 78,210m)		S3-PC-29			S / N	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Appendix 11 - Statutory Consultee Agreement Communication

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Northern Ireland Environment Agency
www.daera-ni.gov.uk

Natural Environment Division
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast
BT7 2JA

Telephone: 028 9056 9812

Mr Seamus Keenan
DFI Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

Our Ref: DC/LJ A5

17 October 2017

Dear Mr Keenan,

Re: A5WTC Appropriate Assessment

NIEA CDP has considered the consultation on the Habitats Regulations Assessments (HRAs) relating to the proposed A5 Western Transport Corridor received on 24 August 2017 and discussed at a meeting held on 6 September 2017 and makes the following comments.

NIEA CDP previously queried drainage from the scheme, both during construction and operation, which will ultimately be to the River Foyle and Tributaries SAC/ASSI. The HRA documents reference a measure of 50 mg/l for total suspended solids to be placed on any discharge consent and that the Water Framework Directive measures will be incorporated. It is advised that the rationale and appropriateness of this value are explicitly included in the document given the status of the receiving water body as an SAC in part of spawning Atlantic salmon. The highest possible level of protection should be afforded to the SAC rivers and justification provided that no unnaturally high levels of suspended solids will be introduced.

The documents include proposed use of rip-rap constructed from gabion mattresses. Concerns previously raised surrounded the use in high energy rivers where there is a risk that structures can become damaged leading to loss of contents to the extent they can form fish traps leading to adverse effects on fish species including Atlantic salmon. Consideration of this has not been made. It is advisable that alternatives to gabion baskets should be investigated. Further to this, clarification should be provided regarding clear span bridges – if these are clear span then protective measures such as gabion baskets should not be required.

The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205 metres. Air quality modelling has been undertaken using ADMS Roads. All works associated with the appropriate section will be carried out within 500 metres of the SAC. The initial modelling indicated that nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was indicated as being an error in modelling and an explanation has been

provided. The rationale within this document should clearly explain the parameters which have affected the results given its public availability.

The current modelling indicates that deposition would be between 0.2 and 0.4% of the critical load for the site. In line with current policies NIEA CDP considers the modelled values to be insignificant.

If you require any further information please contact Lee Jones on the above number.

Yours sincerely,

Keith Finegan
Authorised Officer

Cc: Manny Gault - Client Project Manager - A5 WTC – (email)

Subject: FW: 2017-06-05_SI to DAHG_HRA Consultation

From: Manager Dau [mailto:Manager.Dau@chg.gov.ie]
Sent: 02 October 2017 12:02
To: Ireland, Stuart <Stuart.Ireland@wsp.com>
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Hi Stuart,

The Department has no further nature conservation comments in relation to the updated documents.

Kind regards,

Yvonne

Yvonne Nolan
Development Applications Unit
Department of Culture, Heritage, and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

(053) 9117382

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

From: Ireland, Stuart [mailto:Stuart.Ireland@wsp.com]
Sent: 02 October 2017 10:13
To: Manager Dau
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Dear Yvonne,

As you may be aware, the 3rd consultation on the A5 Western Transport Corridor, Habitats Regulations Assessments, closes today.

Could you please let me know if NPWS has any comments to make in realtion to the updated documents?

Kind regards,

Stuart

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Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

DfI Roads Western Division
County Hall
Drumragh Avenue
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BT79 7AF

08 November 2017

Dear Sir/Madam

RE: 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment.

Thank you for your recent correspondence in relation to the above-mentioned proposed development. The Loughs Agency is the statutory body charged with the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

The Loughs Agency has considered the information provided in the 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment and would have no further comments at this stage.

Yours sincerely

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Loughs Agency

Gníomhaireacht na Lochanna
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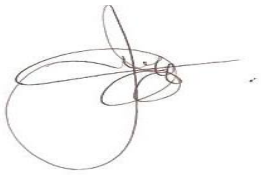

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Habitats Regulations Assessment

Report of Information to Inform an Appropriate Assessment:

718736-3000-R-018 Special Protection Areas (SPAs)

A5 Western Transport Corridor

November 2017

Produced for

Department for Infrastructure

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Distribution

Organisation	Contact	Copies
Department for Infrastructure	Seamus Keenan	1
NIEA	David Chambers – Conservation Designations and Protection Planning Response Team	1 1
Development Applications Unit National Parks and Wildlife Service	Yvonne Nolan	1
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Publication		Deposit Locations

Schedule of Changes

The following table outlines the updates made to the Report of Information to Inform Appropriate Assessment: SPAs, on receipt of comments received in response to the 3rd consultation concluding in October 2017.

Section Edited	Update
Front Cover	Contact Details
Document Control Sheet	Revision, Status, Record of Issue details, Distribution details, Footnote moved to Section 1
Table of Contents	Appendices added, table 4.1 amended to 6.1
1.1.1	Typo corrected and footnote added. Guidance text refined
1.1.2	Minor text amendment for clarity and guidance text refined
1.1.3	Minor text amendment for clarity
1.1.5	Minor text amendment for clarity
1.1.6	Minor text amendment for clarity
1.1.6, 8.1.3 Footnote 1	Minister amended to Competent Authority
1.2.1	Text deleted to avoid repetition
1.2.2	Additional text added to clarify links to national primary road network in the Republic of Ireland, other minor text amendments for clarity
1.2.3	Minor text amendment for clarity
1.3.3	Minor text amendment for clarity
1.3.5	Minor text amendment for clarity
1.3.6	Minor text amendment for clarity and qualifications of reviewers added
2.2.8	Minor text amendment for clarity
Tables 3.1 – 3.3	Cross reference to Statutory Consultee agreement added and minor text amendment for clarity for AADT. Table references updated.
4.2.6	Minor text amendment for clarity
4.3.3	Cross reference updated
5.1.2	Typo corrected
6.1.1 and Table 6.1	Table ref updated
7.1	Typo corrected
7.2.16	Minor text amendment for clarity
7.2.18	Minor text amendment for clarity
7.2.23	Minor text amendment for clarity

Section Edited	Update
Footnote 23	Minor text amendment for clarity
7.2.26	Minor text amendment for clarity
7.3	In-Combination Effects paragraph added
8.1.3	Paragraph deleted, no longer relevant
8.1.5	Conclusion finalised
Appendix 5	New appendix providing Statutory Consultee agreement communications

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Tables

1 Introduction

1.1.1 This document is a Habitats Regulation Assessment (HRA)[1] which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 (as amended[2]), (the Regulations) for the proposed A5 Western Transport Corridor (A5WTC) Scheme.

1.1.2 Following consultation with Northern Ireland Environment Agency (NIEA) and National Parks & Wildlife Service (NPWS) in the Republic of Ireland ten sites were identified as ones which should be considered in accordance with the requirements of the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Regulations:

- River Foyle and Tributaries SAC
- River Finn (Republic of Ireland) SAC
- Owenkillew River SAC
- Tully Bog SAC
- Lough Swilly (including former Inch Lough and Levels) SPA
- Lough Foyle SPA (Northern Ireland)
- Lough Foyle SPA (Republic of Ireland)
- Lough Neagh and Lough Beg SPA

[1] The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.

[2] As amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

- Lough Foyle Ramsar Site
- Lough Neagh & lough Beg Ramsar Site

1.1.3 This document (HRA – SPAs) is one of four reports to inform the Appropriate Assessment, and specifically addresses the SPAs (Lough Foyle SPA (NI and RoI); Lough Swilly SPA and Lough Neagh and Lough Beg SPA).

1.1.4 A further three documents have been produced, namely:

- HRA Report - Tully Bog SAC
- HRA Report – Watercourse SACs (for River Foyle & Tributaries SAC, River Finn SAC and Owenkillew SAC); and
- Ramsar Site Assessment Report[3] (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.

1.1.5 A first draft of this report was published for consultation in 2014 and responses were received at that time. The content of those responses, and any design changes which arose from the 2016 Public Inquiry of the Scheme, were taken into account in developing two further draft reports, which was published for consultation in April 2017 and August 2017 in which the general public were also invited to provide responses[4].

1.1.6 The Northern Ireland Environment Agency (NIEA) as part of the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland (NI), the Loughs Agency, (as a statutory consultee for both NI and the Republic of Ireland), the National Parks and Wildlife Service (NPWS) (as a statutory consultee for the Republic of Ireland) as well as the Royal Society for the Protection of Birds (RSPB), were consulted throughout the development stages of this report. Comments received from these bodies, as well as information and relevant comments received from public consultation, have been addressed and incorporated in this final report, which will be considered by Department for Infrastructure (DfI) as the Competent Authority when undertaking the

[3] Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites

[4] The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- '*Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.*

Appropriate Assessment required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and the Regulations.

1.1.7 Comments from the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland (NI), the Loughs Agency (as a statutory consultee for both NI and the Republic of Ireland), The Northern Ireland Environmental Agency (NIEA), Royal Society for the Protection of Birds (RSPB), as well as information and relevant comments received from the public, have been used to inform this third draft Consultation report. The National Parks and Wildlife Service (NPWS) were directly consulted for the 2nd consultation and these organisations confirmed they had no comments on the report. Any relevant comments received from the third round of consultation has been incorporated into this final report to be considered by Department for Infrastructure (DfI) and the Competent Authority when undertaking the Appropriate Assessment required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and Regulations.

1.2 Background

1.2.1 The A5 WTC is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (DfI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the Province, provide a strategic link with international gateways. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.

1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal connects to the national primary road network in the Republic of Ireland at 2 locations, the N14/N15 roads at Strabane/Lifford into Co. Donegal and the N2 at Aughnacloy into Co. Monaghan. Donegal County Council are promoting a new road which connects the A5WTC to the N15 just south of Lifford and this connectivity has been developed in co-operation with the A5WTC project team. These proposals have been progressed through the statutory process and the decision to proceed will be confirmed so that construction and opening to traffic coincides with the opening of the A5WTC around Strabane. This scheme crosses the River Finn SAC and the proposals have been subject to HRA within the Republic and considered under the cumulative effects section of the relevant WSP reports (see 1.1.2 above). Proposals to upgrade the N2 are currently on hold and any impacts on the A5WTC at the border in Co. Monaghan cannot be assessed at this point in time, though this location nor the consequences of change at this location are considered as not affecting any of the Natura 2000 sites considered in these Reports.

1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Appendix 1 - Sheets 1 to 24:

- Phase 1a: Junctions 1-3 (New Buildings – north of Strabane) and Phase 1b: Junctions 13-15 (south of Omagh – A4,Ballygawley) between 2017 and 2019;

- Phase 2: Junctions 3-13 (north of Strabane – south of Omagh) between 2021 and 2023; and

- Phase 3: Junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.

1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft HRA which recognised and screened[5] the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment[6].

1.2.5 Further studies have since been completed to address this need for a more robust HRA, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.

1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

[5] The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by NIEA, the statutory consultee relative to the designated sites in Northern Ireland and the NPWS the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

[6] The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (*Salmo salar*), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.

1.3 Preparation of the HRA

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.

1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a Site of Special Scientific Interest (SSSI) was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

1.3.4 Stuart has been assisted by Andy Bascombe, BSC (Hons), MSc, PhD, CEnv, CSci. Andy is a Technical Director at WSP with specific responsibility for ecology, with over 25 years of experience in environmental consultancy. He holds a BSc in Biological Sciences from Leicester University, an MSc in Ecology from UCNW Bangor, and a PhD in Applied Ecology from Middlesex Polytechnic. He is a Chartered Scientist and a Chartered Environmentalist and a full member of both the Chartered Institute of Ecology and Environmental Management and the Chartered Institution of Water and Environmental Management.

1.3.5 Andy has worked on a wide range of projects in the UK and overseas for public and private sector clients, local planning authorities, government departments and other bodies, providing ecological and environmental advice at all stages of developments. He is an experienced project manager who has been responsible for environmental aspects of major developments, and has managed Environmental Statements and Enivironment Impact Assessments (EIAs) produced for planning applications, undertaken specialist studies including numerous Habitats Regulations Assessments and Appropriate Assessments. He has given expert witness evidence at several Public Inquiries, and has a thorough appreciation of the requirements of all stages of development having worked on projects from conceptual design through to post-construction monitoring.

1.3.6 The assessment was also reviewed and added to by Mabbett Associates (Dr James O'Neill - BSc (Hons) Zoology PhD Ecology and Conservation, Dr Gen Cannibal - BSc Environmental Biology, MSc Environmental Assessment and Management, PhD Environmental Impact Assessment (2nd Consultation Draft) and Beverley Walker – BSc (Hons) Botany Grad Dip Env. Law (UK & EU), (2nd, 3rd Consultation Draft and final report)).

2 HRA Process

2.1 Objectives

2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.

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

2.1.3 Favourable conservation status of a site is achieved when:

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

2.1.4 The favourable conservation status of a species is achieved when:

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

2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.

2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.

2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.

2.1.8 The purpose of this report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation

measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000 & 2001)', and 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09). EU Guidance on Climate Change and Biodiversity (2013) was reviewed. In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of Likely Significance

2.2.2 This is where it is established if an appropriate assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment

2.2.3 Should Stage 1 determine that there is a 'likelihood' of an effect on the qualifying features of a site, or that any significant effects cannot be ruled out, then the assessment proceeds to Stage 2. This stage considers the potential impacts on the structure and function (**integrity**), as well as the **conservation objectives** of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage includes:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of the likely impacts on the conservation objectives of the site, and an assessment of their significance;
- Mitigation Measures; and

- Conclusions.

2.2.4 If it cannot be ruled out that no significant adverse effects will occur on a site's conservation objectives, then the assessment proceeds to Stages 3 and 4.

Stage 3: Assessment of alternative solutions

2.2.5 This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

2.2.6 This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.7 This Report addresses Stage 1 and Stage 2 of the HRA Process.

2.2.8 For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

2.2.9 The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

2.2.10 The test of 'significance' is where a plan or project could undermine the site's conservation objectives. The assessment of that risk (of 'significance') must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.

3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the Design Manual for Roads & Bridges (DMRB) method of assessment, screening matrices were completed for each of the potentially affected Natura 2000 sites in 2013. Tables 2.1 to 2.3 provide this information and are supported by reference to the A5WTC ES 2010 (and the A5WTC ES 2016 where appropriate).

Table 3.1 Screening Matrix for Lough Foyle SPA

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA		
Project Name:	A5 WTC	
Natura 2000 Site under Consideration:	Lough Foyle SPA	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
23/07/13	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale *(road type and probable traffic volume)*	The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (Average Annual Daily Traffic) (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds foraging within these areas.	

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA	
Land-take	There will be no land take within the SPA. Approximately 40 ha of land within the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme.
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The proposed scheme is located approximately 10km south of Lough Foyle SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road.
Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None.
Emissions *(e.g. polluted surface water runoff* *both soluble and insoluble pollutants, atmospheric pollution)*	The SPA is some 10km north and downstream of the proposed works at its closest point. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA.
Excavation requirements *(e.g. impacts of local hydrogeology)*	None.
Transportation requirements	Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon Whooper swan foraging outside of the SPA boundary.
Duration of construction, operation, etc.	The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species.
Other	None.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA	
Location	Any mitigation relevant to the designation feature species of the Lough Foyle SPA is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations.
Evidence for effectiveness	Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	DfI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by DfI will monitor the proposed scheme throughout construction.
Characteristics of European Site(s) *A brief description of the European Site should be produced, including information on:*	
Name of European Site and its EU code	Lough Foyle SPA UK9020031 (including the designated section of Lough Foyle located within the ROI (between Muff and Whitecastle) Foyle SPA (site code 004087)).
Location and distance of the European Site from the proposed works	The proposed scheme is located approximately 10km south of Lough Foyle SPA.
European Site size	2204.36 ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA supports populations of European importance of Bar-tailed Godwit (1,896 individuals, representing 10.8% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)), Whooper swan (890 individuals, representing 8.9% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)) and Light-bellied Brent goose (3730 individuals, representing 18.7% of the wintering population in Ireland (5 year peak mean 1991/2 - 1995/6)). The site also regularly supports at least 20,000 waterfowl (and thereby qualifying as a wetland of international importance).
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Although a control programme has begun, the colonisation and spread of aggressive non-native species, such as *Spartina spp*. is a current problem and poses a potential threat in the future (JNCC website).

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA	
European Site conservation objectives – where these are readily available	Maintain all features in a favourable condition.[7,8]
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Potential Impacts on Whooper swan The scheme has the potential to give rise to effects on Whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site which could lead to a reduction in the populations of birds which form the designation features of the SPA. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. Potential Impacts on Light-bellied Brent geese No Light-bellied Brent geese were recorded within the area of potential interaction between the proposed works and habitats supporting designation feature species. Significant effects, upon the species are unlikely. Potential Impacts on Bar-tailed Godwit No Bar-tailed Godwit were recorded within the area of potential interaction between the proposed works and habitats supporting designation feature species. Significant effects, upon the species are unlikely.	
Initial Assessment *The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	None.
Disturbance to key species	The scheme may cause a significant effect on Whooper swan due to disturbance.

[7] Features refers to the selection features for the SPA.

[8] Individual objectives are set for each feature, they are too numerous to present in this table and are presented in Appendix 2, Table A2.1.

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA	
Habitat or species fragmentation	The scheme is unlikely to cause a significant effect to Whooper swan due to fragmentation since all sites currently used by the designation species will remain available
Reduction in species density	The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it.
Changes in key indicators of conservation value (water quality, etc.)	The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network[9].
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.
Interference with key relationships that define the function of the site	Possible disturbance of Whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan have been recorded under the scheme footprint.
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	Unlikely to be a significant effect as all foraging habitat utilised by Whooper swan will remain.
Loss	The project will not cause direct loss of Whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of Whooper swan.

[9] New UK Policy has placed a ban on the sale of new petrol and diesel vehicles from 2040, which will result in a decrease in traffic related CCG emissions.

Table 3.1 DMRB Screening Matrix for Lough Foyle SPA	
Disruption	No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of Whooper swan. This could have a significant effect on the SPA.
Change to key elements of the site *(e.g. water quality, hydrological regime etc.)*	Not significant.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant effect possible on Whooper swan.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES See Appendix 5

Table 3.2 Screening Matrix for Lough Swilly SPA

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA		
Project Name:	A5 WTC	
Natura 2000 Site under Consideration:	Lough Swilly SPA	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
23/07/13	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale *(road type and probable traffic volume)*	The project involves the construction of an 85 km long dual carriageway involving the construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds foraging within these areas.	
Land-take	There will be no land take within the SPA. Approximately 40 ha of land within the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme.	
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The proposed scheme is located approximately 12km east/south-east of Lough Swilly SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road.	

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA	
Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None.
Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	The SPA is some 12km west/north-west of the proposed works at its closest point. There is no direct hydrological link to the SPA from the proposed works corridor. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA.
Excavation requirements *(e.g. impacts of local hydrogeology)*	None.
Transportation requirements	Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon Whooper swan foraging outside of the SPA boundary[10].
Duration of construction, operation, etc.	The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species.
Other	None.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Location	Any mitigation relevant to the qualifying features of the Lough Swilly SPA is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations.

[10] Since the 2013 screening, further consultee advice has resulted in the inclusion of Greylag goose as a consideration when assessing disturbance effects outside the SPA boundary. This has been undertaken as part of the Stage 2 assessment below.

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA	
Evidence for effectiveness	Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	DfI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by DfI will monitor the proposed scheme throughout construction.
Characteristics of European Site(s) *A brief description of the European Site should be produced, including information on:*	
Name of European Site and its EU code	Lough Swilly SPA (Site Code IE004075)
Location and distance of the European Site from the proposed works	The proposed scheme is located approximately 12km to the east/south-east of the closest extent of the Lough Swilly SPA.
European Site size	The site comprises the inner part of Lough Swilly and extends from just south of Letterkenny north to Rathmullan. With the subsumed Inch Lough and Levels SPA the complex is approximately 82.6km^2 in size.
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA supports internationally important wintering populations of Greenland white-fronted geese (5 year mean of winter maximum 1995/96-1999/00 of 970 individuals), Whooper swans (5 year mean of winter maximum 1995/96- 1999/00 was 1,135 individuals, the largest population in the country) and Greylag geese (5 year mean of winter maximum 1995/96-1999/900 was 2,020 individuals - incorporating both migratory birds of the Icelandic population and smaller numbers of feral birds). In the three winters 1995/96 to 1999/2000, 18 species occurred in nationally important numbers as follows (figures are average maximum counts for the 3 winters): Great Crested Grebe (284), Grey Heron (57), Shelduck (772), Wigeon (1,580), Teal (1,581), Mallard (1,169), Shoveler (60), Scaup (103), Goldeneye (170), Red-breasted Merganser (127), Coot (514), Oystercatcher (1,595), Knot (303), Dunlin (7,285), Curlew (1,720), Redshank (1,404), Greenshank (48) and Common Gull (1,523). Other species which occur include Light-bellied Brent Goose (152), Pochard (102), Golden Plover (749), Lapwing (1,408), Ringed Plover (81), Grey Plover (15), Bar-tailed Godwit (139) and Turnstone (73). The site is an important area for Great Northern Diver (19) and the rare Slavonian Grebe (11). The rare winter visitor, Pink-footed Goose, also occurs (15). Nationally important numbers of Mute Swan (265) also use the site. Inch Lough supports the largest tern colony in the north-west, with nationally important populations of Sandwich Tern (258 pairs in 2001) and Common Tern (89 pairs in 2001) occurring. There is also a

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA	
	nationally important colony of Black-headed Gull (800 pairs in 2001), which represents one of the largest populations in the country. The site is regularly used by in excess of 20,000 waterfowl and therefore qualifies as of international importance. Other species of note using the site are: Herring Gull and Little Grebe. The site is also used by Irish hare.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable land-use practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled.
European Site conservation objectives – where these are readily available	Objective 1: To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Lough Swilly SPA. Objective 2: To maintain the favourable conservation condition of the wetland habitat at Lough Swilly SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
<u>Potential Impacts upon Whooper swan</u> The scheme has the potential to give rise to effects on Whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. <u>Potential Impacts upon Greylag geese</u> The scheme has the potential to give rise to effects on Greylag geese associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. <u>Potential Impacts upon Greenland White-fronted geese</u> No Greenland white fronted geese were recorded within the area of potential interaction between the proposed works and habitats supporting SPA qualifying species. Significant effects, upon the species are unlikely. <u>Potential Impacts on other designation feature species</u> A few individuals of other designation feature species have been recorded on the River Foyle. No significant effects are predicted for these species.	
Initial Assessment	

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA	
The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	None.
Disturbance to key species	The scheme may cause a significant effect on Whooper swan and/or Greylag geese due to disturbance.
Habitat or species fragmentation	The scheme is unlikely to cause a significant effect to Whooper swan or Greylag geese due to fragmentation since all sites currently used by the designation species will remain available
Reduction in species density	The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it.
Changes in key indicators of conservation value (water quality, etc.)	The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network[11].
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.
Interference with key relationships that define the function of the site	Possible disturbance of Whooper swans and/or Greylag geese on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan or Greylag geese have been recorded under the scheme footprint.

[11] *Ibid* footnote 10

Table 3.2 DMRB Screening Matrix for Lough Swilly SPA	
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	Unlikely to be a significant effect as all foraging habitat utilised by Whooper swan will remain.
Loss	The project will not cause direct loss of Whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of Whooper swan and/or Greylag geese.
Disruption	No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of Whooper swan and/or Greylag geese. This could have a significant effect on the SPA.
Change to key elements of the site *(e.g. water quality, hydrological regime etc.)*	Not significant.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant effect possible on Whooper swan and Greylag geese.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**YES** See Appendix 5

Table 3.3 Screening Matrix for Lough Neagh & Lough Beg SPA

Table 3.3 DMRB Screening Matrix for Lough Neagh & Lough Beg SPA		
Project Name:	A5WTC	
Natura 2000 Site under Consideration:	Lough Neagh & Lough Beg SPA	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
23/07/13	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will cross the River Foyle and Tributaries SAC in 2 locations and be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale *(road type and probable traffic volume)*	The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the SPA, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the SPA. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the SPA and on birds from the SPA which are foraging within these areas.	
Land-take	There will be no land take within the SPA. Approximately 40 ha of land within the area of the Foyle floodplain known to support birds associated with the SPA will be lost to the scheme.	
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The proposed scheme is located approximately 20km west/south-west of Lough Neagh & Lough Beg SPA. Nevertheless birds which are known to use the SPA and which are designation feature species of the SPA are known to utilise an area of the Foyle floodplain partially encompassed within the project corridor during the winter months between Magheramason and the Burn Dennett crossing. In this location the proposed scheme varies between 0.3km and 1.8km from the River Foyle, running initially to the west of the existing A5, crossing to east of	

	the existing A5 north of Bready and crossing back to west of the existing A5 just south of Grangefoyle Road.
Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None.
Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	The SPA is some 20km west/south-west of the proposed works at its closest point. Emissions from the scheme, including run-off from construction and operation, and vehicle emissions are not likely to interact with the SPA.
Excavation requirements *(e.g. impacts of local hydrogeology)*	None.
Transportation requirements	Construction related traffic and operational use of the scheme may result in potential disturbance impacts upon Whooper swan foraging outside of the SPA boundary during migration.
Duration of construction, operation, etc.	The construction of the northern section of Phase 1 of the proposed scheme will take 2-3 years. Phase 2 and 3 are outside of the possible area of interaction with the SPA species.
Other	None.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	At present the operational requirements of the construction are not finalised, therefore potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Location	Any mitigation relevant to the designation feature species of the Lough Neagh & Lough Beg SPA is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations.
Evidence for effectiveness	Potential mitigation in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Transport NI will place contractual obligations on contractors to provide all necessary mitigation identified in Stage 2 of the assessment. Environmental Representatives employed by Transport NI will monitor the proposed scheme throughout construction.
Characteristics of European Site(s)	

A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Lough Neagh and Lough Beg SPA (Site Code UK9020091)
Location and distance of the European Site from the proposed works	The proposed scheme is located approximately 20km to the west/south-west of the closest extent of the SPA.
European Site size	The site comprises Lough Neagh, Lough Beg and Portmore Lough and is 41,188 Ha in size.
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The site regularly supports internationally important numbers of wintering Bewick's swan (the five year peak mean for the period 1989/90 to 1993/94 was 251 which comprises 1.5% of the Western and Central Europe population and 10% of the Irish population) and Whooper swan (the five year peak mean for the period 1989/90 to 1993/94 was 923 which comprises 5.4% of the total Icelandic breeding population and 6.5% of the Irish population). The site also qualifies under Article 4.1 by regularly supporting nationally important numbers of breeding Common Tern (200 pairs in 1995 which comprises 7.4% of the Irish population). The site regularly supports over 20,000 waterfowl in winter, including Pochard, Tufted duck and Goldeneye. Lough Neagh is also notable for supporting an important assemblage of breeding birds including the following species which occur in nationally important numbers: Great Crested Grebe, Gadwall, Tufted duck, Snipe, Redshank, Common Gull, Lesser Black-backed Gull and Black-headed Gull. Other important breeding wetland species include Shelduck, Teal, Shoveler, Lapwing and Curlew.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood although it may have had a positive impact on wintering diving duck. Although some species e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl. Introduction of/invasion by non-native species such as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe.

	Sand dredging is widespread throughout the Lough but the impact is largely unknown. An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and refine existing conservation objectives. A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site. Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such as agric-improvement schemes and Water Quality Management Plans to further address this issue are being considered.
European Site conservation objectives – where these are readily available	To maintain each feature in a favourable condition[12,13].
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Potential Impacts on Whooper swan The scheme has the potential to give rise to effects on Whooper swan associated with this SPA through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. Potential Impacts of Bewick's swan No Bewick's swan were recorded in the area of potential interaction between the proposed scheme and the habitat supporting SPA designation feature species. Potential Impacts on other designation feature species Small numbers of Pochard, Tufted duck and Goldeneye were noted on the River Foyle. No significant impact is predicted for these species.	
Initial Assessment *The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.*	

[12] Feature refers to the selection features for the SPA.

[13] Individual objectives are set for each feature, they are too numerous to present in this table and are presented in Appendix 2, Table A2.2.

Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	None.
Disturbance to key species	The scheme may cause a significant effect on Whooper swan due to disturbance.
Habitat or species fragmentation	The scheme is unlikely to cause a significant effect to Whooper swan due to fragmentation since all sites currently used by the designation species will remain available
Reduction in species density	The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the Foyle floodplain adjacent to the works by some or all of the designation species population that currently use it.
Changes in key indicators of conservation value (water quality, etc.)	The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network[14].
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.
Interference with key relationships that define the function of the site	Possible disturbance of Whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan have been recorded under the scheme footprint.
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	Unlikely to be a significant effect as all foraging habitat utilised by Whooper swan will remain.

[14] *Ibid* footnote 10

Loss	The project will not cause direct loss of Whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of Whooper swan.
Fragmentation	No disruption of the SPA will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of Whooper swan. This could have a significant effect on the SPA.
Disruption	Not significant.
Disturbance	No habitat loss within the SPA. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan have been recorded under the scheme footprint.
Change to key elements of the site *(e.g. water quality, hydrological regime etc.)*	There could be a significant effect subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant effect possible on Whooper swan.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**YES** See Appendix 5

3.1.2 Concluding the screening exercise, the four SPAs under consideration have been subject to a screening exercise for the currently proposed scheme based on the guidance provided in HD 44/09 and using the suggested screening matrix template provided in Annex 4 of the guidance to record the findings of the process. In all three instances it has been concluded:

- the proposed scheme is a project which is not connected with or necessary to the management of the SPAs;
- the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
- that an appropriate assessment should accordingly be undertaken.

4 Stage 2 – Appropriate Assessment

4.1 Introduction

4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:

- A description of the Natura 2000 sites that will be considered in the AA;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan;
- Mitigation Measures; and
- Conclusions.

4.2 Scope of the information to inform the appropriate assessment

4.2.1 'To ensure that all relevant information is considered in the assessment, the Department has carried out two consultations on the draft report and responses received have been taken into account in the development of this third draft Report.'

4.2.2 Across the board spectrum of potential impacts considered and assessed by the studies carried out to date, likely impacts identified which cannot be screened out on the basis of objective information on likely significant effect relate solely to:

- loss of feeding habitat (functional habitat)[15] at Dunnalong/Thorn Hill and Grange Foyle outside of the SPAs and which is used by wintering birds associated with the four SPAs; and
- disturbance of wintering birds associated with the four SPAs during their use of feeding habitat outside of the SPAs at Dunnalong/Thorn Hill and Grange Foyle.

Loss of feeding habitat used by wintering birds associated with the four SPAs

4.2.3 The assessment has involved quantification of the extent of available feeding habitat within the Dunnalong /Thorn Hill and Grange Foyle areas and comparison with the total extent of

[15] Habitat outside of a designated site which is used / relied on by species associated with the designated site

such habitat available in the two areas. Precise quantification of available feeding habitat in this manner is the most objective means of assessing whether any consequent effect is likely to be significant and is the methodology adopted in this report.

Implications of Climate Change

4.2.4 Long term climate change predictions (to 2080)[16] indicate that natural winter precipitation is predicted to increase, with more frequent extreme winter events. By contrast, summer temperatures will increase and precipitation is likely to decrease. The implications of these changes to population numbers of migratory birds are difficult to predict due to their lifecycle being partly outwith the UK, however it is likely that the areas of land currently used for foraging will flood more often and to a greater extent. This may increase or decrease the areas of land potentially available for foraging, depending on topography, however these will be more likely influenced by agricultural policy and practice.

4.2.5 The potential for greatest disturbance of foraging birds however is in the short term, during the construction phases, which will experience limited climate change effects and will require no amendment to the current proposed adaptive monitoring and mitigation measures.

[16] The project assessment parameters have been based on UK climate change predictions from 2009 (UKCP09). Accordingly, the validity of these forecasts has been reviewed as part of this HRA exercise, using the latest guidance from UKCP09, prior to its proposed update in 2018.

The guidance (*Is UKCP09 still an appropriate tool for adaptation planning? April 2016*) concludes that UKCP09 continues to provide a valid assessment of future climate change over land. In particular it demonstrates that UKCP09 is competitive with results from the most recent assessment by the International Panel on Climate Change (IPCC), (CIMP5), such that:

- Future changes in summer and winter temperatures are consistent between CIMP5 and UKCP09 projections;
- Future winter rainfall changes are consistent between both models.
- Both CIMP5 and UKCP09 projections agree that long term average of summer rainfall are more likely to reduce than increase, however CIMP5 predicts a larger chance of an increase in summer rainfall, and less risk of a substantial reduction than UKCP09. This is attributable to the use of different data sets.
- Notwithstanding, the guidance states that users should still continue to regard the full range of UKCP09 results as plausible outcomes for summer rainfall, to consider planning decisions.

The review has concluded that the most up to date projected changes to the baseline environment with regard to precipitation and surface flows in streams as a consequence of climate change, remain the same as those used in the EIA and previous HRA reports. For summer precipitation and river flows, UKCP09 represents a worse-case scenario and under the precautionary principal, has been appropriately adopted as the working assumptions for the Scheme and in this HRA.

Disturbance of wintering birds associated with the four SPAs during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

Data Sources

4.2.6 The following data sources have been relied on:

- data provided in the A5WTC ES 2010, including surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2009 and April 2010;
- data provided in the A5WTC ES 2016, including surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2013 and April 2014 by the Mouchel (now WSP) assessment team; and
- data for use of the area by Whooper swan for 2010-2013 provided by the Irish Whooper Swan Study Group.

Impact assessment

4.2.7 There are no generally accepted thresholds for the loss of functional habitat or the numbers of birds which may be disturbed and displaced in the short-term or long-term from areas of functional habitat. Determination of whether either or both is likely to have a significant effect on the area of functional habitat and the species which use / are reliant on the area with consequent effects on the integrity of a designated site is necessarily context specific.

4.2.8 In the case of the four SPAs considered in this report, habitat loss has been quantified and represented as a percentage of the habitat which surveys have indicated are used and the overall extent of potential functional habitat within the area in the vicinity of the proposed scheme.

4.2.9 Potential for disturbance of the Whooper swan and Greylag geese which annually utilise the area has been considered relative to sources of disturbance during construction and operation and identification and consultation with NIEA and RSPB regarding mitigation measures with a particular focus on construction activities which are likely to involve higher and tonally distinct noise levels and characteristics. A detailed literature review has been carried out for the purposes of HRA and is included within this report. Reference to peer reviewed scientific studies on the impacts of disturbance upon birds, combined with the detailed assessments carried out and reported within the 2010 ES and 2016 ES, enables the assessments to be carried out and conclusions reached which are beyond the threshold of reasonable scientific doubt required by the Birds and Habitats Directives.

4.3 Determination of adverse impact relative to integrity

4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 sites. The assessment determines whether there is likely to be:

- a reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and

- whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.

4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 4.

4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system, as described in 2.2.8 above.*

5 Description of the proposed scheme

5.1 Alignment and relationship to the functional habitat associated with the Four SPAs

5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the four SPAs is shown in Appendix 1 - Figure 1.

5.1.2 The section of the proposed scheme corridor which is of relevance to the four SPAs is that between Magheramason and the Burn Dennet. Here, the proposed dual carriageway will generally be located between 0.3 and 1.8km east of the River Foyle. It is an area of mixed arable and agricultural grassland some 40% of which is within the River Foyle floodplain. Parts of the area are used annually by Whooper swan and Greylag geese associated with the four SPAs for feeding[17].

5.1.3 Detail relating to the peak counts for whooper swan and Greylag geese during the 2009 – 2010 and 2013 – 2014 surveys in the Foyle floodplain is provided in Appendix 11O of the 2016 ES. The location of the birds observed is shown in Figures 2 and 3 of that document (reproduced in Appendix 1 – Figures 2 to 3).

5.1.4 Over this section, the proposed scheme follows a north-south alignment which broadly reflects that of the existing A5. Between Magheramason and Bready it will be located some 200-250m west of the existing road and will be on embankment as it crosses Meenagh Road and approaches a proposed bridge over the existing A5, Victoria Road north of its existing junction with Cloghboy Road. South of the new bridge, the alignment will initially encroach onto the lower western-facing slopes of Sollus Hill in deep cutting. As the dual carriageway continues south it will be some 200m east of the existing road. It will emerge from the cutting and follow an alignment roughly parallel with the A5, crossing beneath Donagheady Road, and following a gentle curve to the south-west, passing between Willow Farm and housing on the A5,Victoria Road. It will cross Willow Road in shallow cutting and rise on high embankment to enable it to be bridged over the A5, Victoria Road. The dual carriageway will descend from the bridge to cross Ash Avenue on low embankment before rising again onto high embankment and crossing Drumenny Road via a new bridge before approaching and crossing the Burn Dennet via a new open span bridge.

5.1.5 Construction of this section, other than at Sollus Hill, will involve the use of large excavators, dump trucks for transporting excavated materials to areas of fill within the working areas, bulldozers, graders, compaction plant including various rollers and soil stabilisation plant. It is not anticipated there will be a need for blasting, the break out of rock at Sollus Hill being implemented by way of rock breakers.

[17] Either regularly during the winter, or during migration to and from the SPAs

6 The Four SPAs

6.1 Introduction

6.1.1 The location, extent and relationship of the four SPAs to the proposed scheme is indicated in Appendix 1 – Figure 1. Details relating to the species identified as the primary reason for selection as a Natura 2000 site and qualifying species are described in Table 6.1. A comment on the vulnerability of the site is included. The information has been obtained from the Natura 2000 data forms obtained from the Joint Nature Conservancy Committee (JNCC) website (www.jncc.gov.uk) and the NPWS website (www.npws.ie). The Natura 2000 data forms are enclosed in Appendix 3.

Table 6.1 Site Descriptions

Site Name	Designation & Code	Designated Feature Species		Vulnerability
		Article 4.1 Species	Article 4.2 Species	
Lough Foyle	SPA UK9020031 (Northern Ireland) 004087 (ROI)	Wintering: Whooper swan Bar-tailed Godwit	Wintering: Light-bellied Brent geese International Wintering Assemblage: Red-throated diver Great crested grebe Mute swan Bewick's swan Greylag geese Shelduck Teal Mallard Wigeon Eider Red-breasted merganser Oystercatcher Golden plover Grey plover Lapwing Knot Dunlin Curlew Redshank Greenshank	Although a control programme has begun, the colonisation and spread of aggressive non-native species such as *Spartina* spp. is a current problem and poses a potential threat in the future. An existing Conservation Plan for Lough Foyle is now under review. This review will update existing management prescriptions and refine existing conservation objectives.

Site Name	Designation & Code	Designated Feature Species		Vulnerability
		Article 4.1 Species	Article 4.2 Species	
		Other notable species: Slavonian Grebe		
Lough Swilly	SPA IE004075	Wintering: Whooper swan Greylag goose Greenland White-fronted goose	Wintering: Great crested Grebe Grey heron Shelduck Wigeon Teal Mallard Shoveler Scaup Goldeneye Red-breasted Merganser Coot Oystercatcher Knot Dunlin Curlew Redshank Greenshank Common gull Mute swan Breeding: Sandwich Tern	The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable land-use practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled.

Site Name	Designation & Code	Designated Feature Species		Vulnerability
		Article 4.1 Species	Article 4.2 Species	
			Common tern Black-headed gull	
		Other Species of Note: Light-bellied Brent goose Pochard Golden plover Lapwing Ringed plover Grey plover Bar-tailed Godwit Turnstone Great northern diver Slavonian grebe Pink-footed goose Herring gull Little grebe Irish hare		

Site Name	Designation & Code	Designated Feature Species		Vulnerability
		Article 4.1 Species	Article 4.2 Species	
Lough Neagh & Lough Beg	SPA UK9020091	<u>Wintering:</u> Bewick's swan Whooper swan <u>Breeding:</u> Common tern	<u>Wintering:</u> Pochard Tufted duck Goldeneye <u>Breeding:</u> Great crested grebe Gadwall Tufted duck Snipe Redshank Common gull Lesser black-backed gull Black-headed gull	The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood although it may have had a positive impact on wintering diving duck. Although some species e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl.

Site Name	Designation & Code	Designated Feature Species		Vulnerability
		Article 4.1 Species	Article 4.2 Species	
		Other Species of Note: Breeding: Shelduck Teal Shoveler Lapwing Curlew		Introduction of/invasion by non-native species such as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe. Sand dredging is widespread throughout the Lough but the impact is largely unknown. An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and refine existing conservation objectives. A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site. Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such as agri-improvement schemes and Water Quality Management Plans to further address this issue are being considered.

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7 Potential impacts and mitigation

7.1 Loss of feeding habitat used by wintering birds associated with the Four SPAs

7.1.1 The area of the Foyle floodplain between Magheramason in the north and the Burn Dennett in the south has been identified by RSPB and the Irish Whooper Swan Study Group as the area of functional habitat for which there is an interaction between the proposed scheme and the qualifying species of the SPAs, due to the use of the area by birds associated with the SPAs for foraging, either as a regular winter foraging area, or during migration to and from the SPAs. Significant numbers of birds associated with the SPAs have been recorded within the Foyle floodplain, thus the potential impact of the scheme may be significant in terms of the integrity of the SPA and requires further assessment to determine if that is indeed the case.

7.1.2 There is approximately 1200 ha of potential foraging habitat within the area.

7.1.3 Figures 2 and 3 in Appendix 1 provide peak count numbers and locations of all recorded qualifying bird species for the surveys undertaken in 2009-2010 and 2013-2014 respectively. The numbers demonstrate that the area is used by two species, Whooper swan and Greylag goose. They also demonstrate that numbers for 2013-2014 have been significantly lower than the numbers recorded in 2009-2010 and that fewer parts of the area have been used. Discussion with RSPB indicated that birds were using foraging areas within the RoI, outside of the survey area, and at a significant distance from the proposed construction. For the purposes of this assessment it has been assumed the higher numbers and more dispersed pattern recorded in 2009-2010 is more representative of the use of the area by birds associated with the functional habitat, and is more likely to reflect the long term implications of wetter winters associated with climate change predictions.

7.1.4 Field survey results from 2013/2014 showed a peak count of 873[18] birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 46% of the Whooper swan utilising the Lough Foyle/Lough Swilly SPA complex in January 2005. A peak count of 22 birds from north of Dunnalong Road equates to approximately 1.2% of the Whooper swan utilising the Lough Foyle/Lough Swilly SPA complex based upon data from 2005. This represents a change in use pattern when compared to the 2009 A5 WTC EIA study (Mouchel (now WSP), 2009), with fewer birds using the area north of Dunnalong Road and more within the Grange Foyle area.

[18] This peak count is a summation of all of the highest counts regardless of the month in which those counts occur, it is likely to be artificially high, but allows a robust and precautionary approach to impact assessment.

7.1.5 Field survey results from 2013/2014 showed a peak count of 218 birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 9.2% of the Greylag geese utilising the Lough Foyle/Lough Swilly SPA complex. The single bird observed north of Dunnalong Road represents <0.1% of the Greylag geese utilising the Lough Foyle/Lough Swilly SPA complex.

7.1.6 During 2009-2010 an area of approximately 330 ha was used by up to 430[19] Whooper swan, and an area of approximately 150 ha was used by up to 350 Greylag geese. During 2013-2014 an area of approximately 130 ha was used by up to 205 Whooper swan, and an area of approximately 117 ha was used by up to 65 Greylag geese.

7.1.7 The proposed scheme will involve the loss of approximately 40 ha of land within the area of potential functional habitat representing some 3% of the total area of potential habitat. None of the land take will affect parts of the area where use by either species has been recorded in the two surveys periods. As can be seen from Figures 2 and 3 (Appendix 1), there are two core areas of usage by these birds within the study area, neither of which is subject to landtake by the Proposed Scheme. In addition, there are alternative feeding sites located elsewhere along the river.

7.1.8 In light of the small percentage of potential loss and absence of loss in areas where use has been demonstrated, it has been concluded there will be no need for mitigation in the form of provision of compensatory habitat. This conclusion is based upon the Source-Pathway-Receptor conceptual model of impact assessment.

7.1.9 In order for the existence of an impact to be proven, all three elements of the model must be present in any given context. In this case, the receptor is absent from potentially impacted areas. As no qualifying bird species have been shown to utilise the impacted areas, a corollary of that finding is that no impact is likely to arise which may adversely impact upon them.

7.2 Disturbance of wintering birds associated with the four SPAs during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

The effects of disturbance on avifauna

7.2.1 Disturbance has the potential to produce negative impacts on wild bird populations. However, the way in which disturbance affects bird populations is complex and predicting impacts requires a detailed knowledge of how disturbance affects populations and how this varies between species. The aim of this section is to review relevant research with a view to understanding whether any of the predicted sources of disturbance are likely to have a negative impact on populations of birds using the area around the proposal and, in particular,

[19] These numbers represent the highest count during a single survey visit, and allow an accurate calculation of the area of forage habitat in use at any one time.

whether this could have an unacceptable impact on any species associated with the Special Protection Areas

7.2.2 The role of disturbance on bird populations has been extensively studied both to identify problems with species of conservation concern and as a tool in deterring unwanted species from sensitive areas e.g. airports and valuable crops. While most organisations concerned with management of the countryside actively encourage increased access to the countryside, the resultant increased disturbance can often have significant negative effects on wildlife.

7.2.3 There are two factors to consider when assessing the impact of human disturbance on feeding areas. First, does the disturbance lead to changes in behaviour? Second, does any consequent change in behaviour affect mortality, reproductive success or population size (Gill et al. 2001). The majority of studies on disturbance concentrate on the first factor in one of two ways: comparison of animal distributions between areas with and without disturbance (e.g. Tuite, Hanson and Owen 1984; Pfister, Harrington and Lavine 1992; Sutherland and Crockford 1993; Milsom et al. 2000), and observations of the direct effects of disturbance on behaviour (e.g. Draulans and van Vessem 1985; Belanger and Bedard 1989). Many studies of this type have focussed on shorebirds as they appear susceptible to disturbance and occur in areas used by large numbers of people (e.g. Burger 1981; Kirkby, Clee and Seager 1993; Smit and Visser 1993).

7.2.4 It is generally accepted that most waterfowl populations are limited by availability of food during the winter months (see Owen and Black 1990 for a review). The factors controlling the populations are thought to be “density-dependent” and lead to the population tending towards the “carrying capacity” i.e. the numbers an individual site can support. For example, when numbers of a species are relatively high, mortality will increase resulting in a decrease in the population. Conversely, when numbers are low, mortality will decrease until numbers increase to the carrying capacity of an area. In the case of waterfowl, density-dependence is thought to act through two factors. First, through the availability of prey/food during the winter months. Second, through the levels of fat birds can lay down prior to spring migration. This is important, as the breeding success of many species is directly related to the availability of reserves on arrival in the breeding grounds, especially for arctic-breeding waders and wildfowl.

7.2.5 The nature of the density-dependent factors and the timing of their impact need to be understood if meaningful management measures are to be employed. This is recognised in the models used to assess the “surplus” in wildfowl populations that can be exploited through wildfowling. In these models, mortality before the winter food “bottleneck” (when mortality becomes density-dependent) is termed “compensatory mortality” as the removal of birds at this time reduces the mortality during the population bottleneck. Mortality after the bottleneck, will result in a reduction in the population (as the population has already been reduced to the “carrying capacity”) and is termed “additive mortality”.

7.2.6 The recent development of incorporating behavioural ecology theory into conservation research has led to a much better understanding of how factors such as disturbance or habitat loss affect populations of wild animals (Sutherland 1998). In particular, studies of waterfowl populations have changed the way potential impacts should be assessed (Gill 2007, Stillman et al. 2007). These studies have led to an increased understanding of the roles of various

potential threats to populations and have even led to the first models capable of predicting impacts of development on major estuarine sites (Durrell et al 2005).

7.2.7 Studying the impact of shellfishing at low tide on Oystercatchers on the Exe estuary, Stillman et al (2000), examined the role of disturbance in reducing access to feeding areas. This model was modified to take into account the time and energy costs associated with that disturbance, including energy expended flying away from disturbance and feeding time lost as a result of the disturbance (West et al 2002). This study showed that disturbance from many small sources was more significant than fewer large scale sources and that disturbance could be more significant than habitat loss. However, the model also made recommendations on how to minimise the impact of the disturbance and that "preventing disturbance during late winter, when feeding conditions were worse, practically eliminated its predicted population consequences" (Stillman et al 2007). The model demonstrated that disturbance produced very little impact if restricted to daylight hours and if occurring before 1 December. Large-scale disturbance (10% of the site) produced less effect than numerous small events as this involved less commuting energy.

7.2.8 In a major study of wading birds on the Seine estuary, France, Durrell et al (2005) used a similar behaviour-based model to predict the impact of an extension to the port at Le Havre on the Seine estuary. They were able to assess the significance of;

- a reduction in available habitat;
- disturbance during the night and the day;
- the introduction of a buffer zone around the development;
- the effectiveness of introducing a new mudflat area as mitigation.

7.2.9 Supporting the findings of the effect of daytime disturbance on Oystercatchers on the Exe estuary, the authors found "when we simulated disturbance occurring during the daytime only, birds were able to feed within this area at night. In this case, the effect of disturbance was greatly reduced in dunlin and removed altogether in curlew and oystercatcher". Introduction of a 150m "buffer" zone "effectively removed the effect of disturbance on feeding shorebirds.

The effect of disturbance on exploitation of resources

7.2.10 The value of a site to a local population can be reduced where disturbance levels result in either reduced levels of exploitation or significantly increased costs associated with that exploitation e.g. commuting costs. Where disturbance may be chronic and birds excluded from feeding areas for long periods of time, feeding when disturbance levels are lower e.g. bad weather, early morning, may result in the same level of use as at sites where disturbance is minimal. The best way to directly assess the role of disturbance on the level of exploitation is to measure prey depletion where the study species is the only predator and where the prey species is non-renewing. This was studied in Black-tailed Godwits feeding on bivalves in the southeast of England. Gill et al. (2001) studied the levels of depletion in bivalve populations at sites experiencing a wide range of levels of disturbance. They predicted that disturbance could result in a slower rate of exploitation, leading to unused resources at the end of the

winter. The level to which the resources are unused will determine the extent of the consequent reduction to carrying capacity of the site.

7.2.11 The study showed that even at sites with very high levels of disturbance (including a yacht club), Godwits visited the disturbed areas during periods of low disturbance and depleted prey to similar levels recorded at sites where disturbance was minimal. This demonstrated that the value of a feeding area to a species may not be diminished as long as birds are able to feed sufficiently often to exploit the site fully.

7.2.12 Following "Ideal Free Distribution" theory, areas of high food availability will be preferred to areas of low availability. Where disturbance does result in reductions in foraging effort, food availability is likely to be greater than on adjoining undisturbed areas. When the source of disturbance is removed, or habituated to (see below), birds would be expected to prefer these areas for foraging and, given sufficient time to exploit the resource, will deplete the resource to the same levels as the adjoining undisturbed areas. The key point in studying this type of scenario is to identify whether sufficient opportunities are available for sites/areas within sites, to be exploited fully.

The potential impact of Construction Activity and Noise

7.2.13 There are two locations where construction will involve noise levels above those associated with the general activities associated with movement and activity of plant and vehicles; where the deep cutting at Bready will involve breaking out of rock at Sollus Hill and where piling will be required for the bridge abutments at the Burn Dennet. The Bready cutting is some 400m from the closest recorded Whooper swan and over 1km from the closest recorded Greylag geese. The Burn Dennett crossing is some 500m from the closest recorded area known to be utilised by Whooper swan and over 2.5km from the closest recorded Greylag geese.

7.2.14 Scottish Natural Heritage (SNH) provide guidance on potential impacts on European/Ramsar Sites[20], in which they state that in relation to noise disturbance of birds:

Studies generally show that birds are disturbed by a sudden large noise but have the ability to habituate (become accustomed to) to regular noises. For instance, with respect to piling specifically, it has been concluded that although piling has the potential to create most noise during construction, it often consists of rhythmic "bangs", which, after a short period, birds are likely to become accustomed to (ABP Research, 2001).

and:

As part of the construction work for ABB Power Generation Ltd (Pyewipe), winter bird monitoring showed that there was no large-scale disturbance due to construction work on the site. Although some localised disturbance was recorded in response to two sudden events,

[20] http://www.gov.scot/Publications/2011/03/04165857/15 accessed 23/03/2017

this was not considered to have a major effect on surrounding bird populations and was found to be no greater than the effect arising from third party disturbance, including walkers and stopped cyclists, which were unrelated to the work carried out by ABB (ERM, 1996). Observations suggested that it was the initial sudden bang during piling activities, which caused the disturbance, and that subsequent bangs typically resulted in reduced disturbance, demonstrating habituation.

These findings were supported by the studies carried out for the Humber International Terminal development, which again indicated that the key factor in triggering disturbance was human presence (ABP Research, 2000). Over 12 separate visits, disturbance by construction activities (which involved piling and reclamation of part of the foreshore) was observed on 3 occasions and in each case birds were disturbed over a small area and then rapidly resettled within the zone of disturbance (i.e. they did not leave the area). More recently, surveys of the birds around the Immingham Outer Harbour in the Humber (using the same methods) have also indicated that such disturbance events are limited and are often attributable to non-Port related activities such as the presence of Peregrine Falcons or walkers on the mudflat (ABPmer, 2010e).

The ABP Teignmouth Quay Development estimated an approximate zone within which birds may be affected by disturbance from construction works (piling and dredging) to be typically about 200m (ABPmer, 2002). The startling effects of sudden noise were quantified, based on published research, by the Environment Agency for the Humber Estuary Tidal Defences scheme. It was concluded that a sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this of approximately 70dB causing flight or anxiety behaviour in some species.

7.2.15 Following discussion with the geotechnical advisors and contractor advisors for the project it has been confirmed that blasting will not be required. Should further information come to light as the proposed scheme design is finalised which demonstrates a need for blasting, there will be a limitation placed on the timing of the activity to exclude the period between October and March when the birds are present. Such a restriction eliminates the potential for adverse impact from this source.

7.2.16 There will also be a requirement under the contract that should it be the intention to undertake breaking out of rock at Bready and piling at the Burn Dennet within the period when the birds are present, trial breaking out and piling must be undertaken with monitoring by an appropriately qualified Ornithological Clerk of Works (OCoW) indicated above.

7.2.17 The trials will involve short periods of breaking out and piling at prescribed intervals to establish if the activity results in disturbance which could prove detrimental, should the more prolonged periods of the activities which will be required to complete the cutting and bridge abutments be progressed. If the trials indicate this will be likely to the case, the activities will be suspended while Whooper swan or Greylag geese are within 300m of the noise source. The following factors will be considered to be probative of detrimental disturbance.

- Physical displacement of birds (flight from source) with non-return within 5 minutes;

- Reduction in foraging activity due to increase in scanning times.

7.2.18 Should either or both of these responses be noted, works will be suspended as above.

7.2.19 In consequence, and subject to the mitigation strategies outlined above, construction disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the SPAs, or the integrity of the sites.

Daytime feeding opportunities

7.2.20 Whooper Swans foraging on land at some distance from water must make daily commuting flights between roosting and foraging areas. In respect of such flights, three factors may safely be assumed to be implicated in the timing and duration of these flight; day length, temperature and safety. During midwinter birds naturally endure long periods of darkness, often combined with low temperatures, and it is probable that birds are likely to have lower morning energy stores than at other times of the year. Additionally, the impact of low temperatures and prolonged darkness is that less time is available for foraging as Whooper swans are visual feeders. Assuming that the time swans spend at their foraging grounds is positively correlated with energy requirements, in midwinter birds should arrive earlier at, and depart later from, their foraging areas. In addition, time spent feeding during the day should increase relative to day length. These conditions may induce an energetic bottleneck during December & January.

7.2.21 With regard to disturbance of the two species associated with construction of the proposed scheme, studies reported by Rees et al (2005) - *Factors affecting the behavioural responses of Whooper swans (Cygnus cygnus) to various human activities* noted that pedestrian presence disturbed Whooper swans when within 250-400m, and that construction vehicles disturbed Whooper swan when within 250m, in contrast to tractors which caused disturbance when within 150m and other farm vehicles which caused disturbance when within 250m.

7.2.22 The proposed scheme will generally involve construction significantly more than 250m from those parts of the area of functional habitat where the presence of the species has been has been recorded during the surveys. Locations closest to parts of the area where presence has been recorded are:

- where the realignment of Donagheady Road will bring the works within 50m of an area of recorded use, although the works will be separated from the swans by the existing A5 with its current levels of traffic (see Operational Disturbance below); and .

- where the proposed introduction of a new link road between Ash Road and Drumenny Road will involve work within 100m of a part of the area where a maximum of 9 Whooper swans were recorded in 2009-2010.

7.2.23 When considering opportunities for the swans and geese to forage for food, it is appropriate to consider available natural light. The period known as “Civil Twilight” is the time in which the sun is <6° below the horizon and is the time during which it is considered light enough to work outside without the need for artificial light. During winter months Civil Twilight lasts approximately 30-35 minutes. Most visual foragers (including swans and geese) will be able to forage effectively during this time and it is likely foraging times will extend beyond this time.

7.2.24 Normal working times specified in the construction contract in relation to the control of noise and vibration are:

- 1st February to 31st October – 07:00 to 19:00 hours
- 1st November to 31st January – 08:00 to 17:00 hours

7.2.25 Therefore, it can be seen from Figure 1 below that during the winter months, there will be sufficient light available for foraging swans and geese during non-working periods in early October and again in early November[21], with a further period light enough for foraging occurring outside working hours from early February onward.

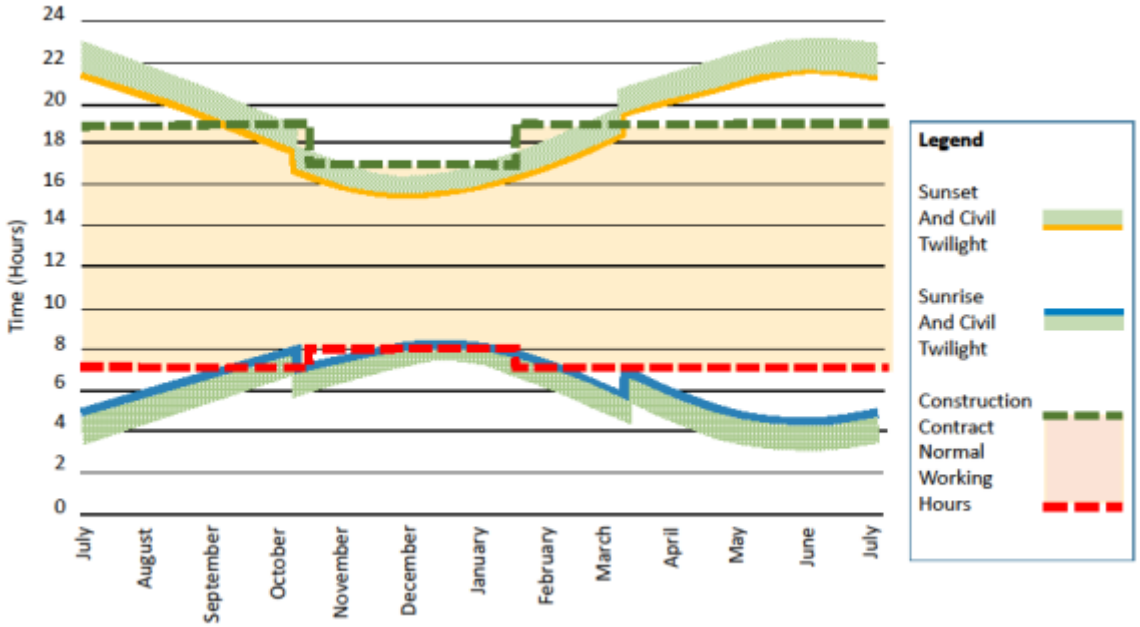

Figure 1: "Civil Twilight" hours in relation to time of year and normal working hours with respect to. noise and vibration on the site within 250m of areas known to be utilised by swans and geese.

7.2.26 The limits of the contract working hours are particularly relevant to visual foragers as they are less likely to feed at night and daylight hours may affect the levels to which they can accrue resources. This could be of particular significance during energetically demanding times such as pre-migration fat deposition and moult.

7.2.27 To minimise adverse disturbance effects upon Whooper swans during this period, there will be no heavy construction work between chainage 5000 and 10,500, within 250m of areas

[21] As clocks go back from British Summer Time (BST) to Greenwich Mean Time (GMT) and it becomes light 'earlier'.

shown to be utilised by Whooper swans and Greylag geese. All construction in this areas would be conducted under the advice of an OCoW. Working hours within these areas will be reduced to between 08.00-17.00 hrs, between 1st October and March 31st, or as advised by the OCoW.

7.2.28 Adherence to the construction time periods, in accordance with OCoW instructions as set out above, will eliminate any potential for a reduction in available foraging opportunities as a result of construction between chainage 5000 and 10,500 known to be utilised by Whooper swans and geese.

7.2.29 The disturbance associated with the proposed development will not be continuous throughout. In view of the close proximity to other feeding areas elsewhere, birds would be likely to respond to periods of no disturbance by feeding preferentially within areas in proximity to the proposal site until the resource levels were similar to neighbouring areas.

7.2.30 As indicated above, a precautionary watching brief will be employed by a suitably qualified and experienced Ornithological Clerk of Works (OCoW). The OCoW will monitor Whooper swan and Greylag goose distribution and behaviour when works identified as potentially disturbing (e.g. noisy work, high numbers of personnel outside of vehicles etc.) are taking place. The watching brief will commence the day before planned activities and will cease the day following planned work. Should the OCoW determine that swans and geese are showing signs of significant disturbance, the ornithologist will immediately inform the Site Manager and Environmental Manager, and works will cease until foraging activity resumes. The following factors will be considered to be probative of detrimental disturbance.

- Physical displacement of birds (flight from source) with non-return within 5 minutes;
- Reduction in foraging activity due to increase in scanning times.

7.2.31 Implementation of the strategy outlined above will eliminate any potential for a reduction in available foraging opportunities as a result of construction between chainage 5000 and 10,500 known to be utilised by Whooper swans and geese.

Operational disturbance

7.2.32 The operation of the proposed scheme also has potential to cause disturbance to bird species, with the noise generated from increased traffic volume and speeds potentially causing the displacement of Whooper swan through increased disturbance. However, behavioural impacts such as disturbance from feeding grounds as a result of construction or operation phases are always context-dependant, with responses to disturbance depending upon the trade-offs experienced by individual birds (Gill, 2007). For example, the decision to stay or to leave an area in response to disturbance will be influenced by the quality of the area, availability and relative quality of alternative areas, and relative predation risk on current and alternative sites among others (Gill, 2007). Habituation, that is 'the relatively persistent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement' (Hinde, 1970), has been demonstrated in the short-term in some studies on disturbance to Whooper swan, however an increased tolerance did not appear to be maintained over longer periods

with the behavioural patterns on a day to day basis providing additional support to this (Rees et al., 2005).

7.2.33 While the closest approach of the mainline to a field with recorded Whooper swan use is around 150m, which is at the limit of the distance recorded for tractor disturbance of Whooper swan (Rees *et al*, 2005), the study was in relation to disturbance 'events' rather than exposure to constant stimuli. Whooper swan have been shown to quickly habituate to continuous traffic movements, for example at the Toome Bypass (Hill. M, 2014, *Pers. Comm*). Therefore, operational disturbance is unlikely to have a significant effect.

7.2.34 To determine the potential for disturbance of Greylag geese it is important to understand the distances over which they will be disturbed. Keller (1989) identified Greylag geese avoid roads in agricultural land in Scotland, with avoidance behaviour recorded for distances of 100m from roads. The closest recorded Greylag geese in any of the studies undertaken was over 500m, thus operational disturbance is unlikely to occur.

7.2.35 Operational disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the SPAs, or the integrity of the sites.

7.3 In-Combination Effects

7.3.1 There are no existing permissions or proposals which will cause additional loss of foraging habitat or disturbance to the Whooper swans or Greylag geese within the scheme zone of influence. In addition, it has been shown that the A5WTC will not have any effect on the species cited for the SPA designations. Therefore, no in-combination effects will arise from the A5WTC proposed scheme.

8 Summary

8.1.1 The Lough Foyle SPAs, Lough Swilly SPA and Lough Neagh & Lough Beg SPA have been identified as Natura 2000 sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Birds Directive, as transposed by the Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland

8.1.2 All four SPAs have been subject to a process of Stage 1 screening based on the guidance provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. In all three instances it has been concluded:

- the proposed scheme is a project which is not connected with or necessary to the management of the SPAs;
- the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
- that Stage 2 Appropriate Assessment should be undertaken.

8.1.3 Following the Stage 2 Appropriate Assessment it is concluded:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design;
- Any increase in the size of core foraging areas outwith the SPA as a consequence of wetter winters due to climate change can be managed through monitoring (a watching brief) by a qualified ornithologist over the construction period; and
- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the SPAs.

8.1.4 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the four sites either independently or in combination with other projects.

9 References

Berlanger, L. & Bedard, J. (1989) Biological responses of staging greater snow geese to human disturbance. Journal of Wildlife Management 53, 713-719.

BirdLife International (2010) IUCN Red list for birds. Downloaded from http://www.birdlife.org on 20/12/2010.

BirdLife International (2010) Species factsheet: Anser anser. Downloaded from http://www.birdlife.org on 22/12/2010.

Burger, J. (1981) The effect of human activity on birds at a coastal bay. Biological Conservation 21, 231-234.

Colhoun, K. (2001). The Irish Wetland Bird Survey 1998 – 99: results from the fifth winter of the Irish Wetland Bird Survey. BWI/NPW/WWT, Dublin.

Crowe, O., McElwaine, J.G., Worden, J., Watson, G.A., Walsh, A., & Boland, H. (2005). Whooper Cygnus cygnus and Bewick's C.columbianus bewickii Swans in Ireland: results of the International Swan Census, January 2005. Irish Birds 7 (2005).

Design Manual for Roads and Bridges (2008a) Volume 11 Section 2, Part 1– HA 201/08 Environmental Impact Assessment.

Design Manual for Roads and Bridges (2008b) Volume 11 Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects.

Draulans, D. & van Vessen, J. (1985) The effect of disturbance on nocturnal abundance and behaviour of grey herons (*Ardea cinerea*) at a fish-farm in winter. Journal of Applied Ecology 22, 19-27.

Durrell, S.E.A. le V. dit, Stillman, R.A., Triplet, P., Aulert, C., Biot, D.O. dit, Bouchet, A., Duhamel, S., Mayot, S. & Goss-Custard, J.D. (2005) Modelling the efficacy of proposed mitigation areas for shorebirds: a case study on the Seine estuary, France. Biological Conservation, 123, 67-77.

European Commission (2000) Managing Natura 2000 Sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

European Council (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

European Court of Justice (2004) Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Case C-127/02. European Court reports 2004 Page 00000

Gill, J. A., Norris, K. & Sutherland, W. J. (2001). Why behavioural responses may not reflect the population consequences of human disturbance. Biological Conservation 97 (2001) 265-268

Gill, J. A. (2007). Approaches to measuring the effects of human disturbance on birds. Ibis 149 (Suppl. 1) pp 9 – 14.

Hearn, R.D. & Mitchell, C.R. (2004). Greylag Goose Anser (Iceland population) in Britain and Ireland 1960/61 – 1999/2000. Waterbird Review Series, The Wildfowl and Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

Hill M. (2014) RSPB Northern Ireland Pers. Comm.

Hinde, R.A. (1970) Animal Behaviour: a synthesis of Ethology and Comparative Psychology. McGraw-Hill.

HMSO (1995) The Conservation (Natural Habitats, &c.) Regulations (Northern Ireland) 1995.

Joint Agencies. Department of Food Environment and Rural Affairs (DEFRA), Department of Environment and Climate Change (DECC), Met Office, Environment Agency (EA) 2016. Is UKCP09 still an appropriate tool for adaptation planning? Land Projections April 2016

Keller V.E. (1989) The effect of disturbance from roads on the distribution of feeding sites of geese (Anser brachyrhynchus, A. anser), wintering in north-east Scotland. Ardea. 79, 229-232.

Kirby, J.S., Clee, C. & Seager, V. (1993) Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary analysis. Wader Study Group Bulletin 68, 53-58.

McElwaine, G. & Spouncer, C. (2006). A6 Road Improvements- Toome to Castledawson: Whooper Swan (Cygnus cygnus) Survey 2005/2006 and Impact Assessment.

Milsom, T.P., Langton, S.D., Parkin, W.K., Peel, S., Bishop, J.D., Hart, J.D. & Moore, N.P. (2000) Habitat models of bird species distribution; an aid to the management of coastal grazing marshes. Journal of Applied Ecology 37: 706-721.

Mouchel (2010) A5 Western Transport Corridor Environmental Statement Volumes 1 to 3. Document Ref 718736-3000-R-008

Mullarney, K., Svensson, L., Zetterström, D. and Grant, P. J. (1999) Bird Guide. HarperCollins Publishers, London.

Office of the Attorney General (ROI) (1997) S.I. No. 94/1997 European Communities (Natural Habitats) Regulations 1997 (as amended).

Owen, M. & Black, J.M. (1990) Waterfowl Ecology, Blackie.

Pfister, C., Harrington, B. A, & Levine, M. (1992) The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation 60: 115-126.

Rees, E.C., Bruce, J.H. 7 White, G.T. (2005). Factors affecting the behavioural responses of Whooper swans (Cygnus c. cygnus) to various human activities. Biological Conservation, 121 (pgs 369-382).

Robinson, J.A., Colhoun, K., McElwaine, J.G. & Rees, E.C. (2004). Whooper Swan Cygnus cygnus (Iceland population) in Britain and Ireland 1960/61 – 1999/2000. Waterbird Review Series, The Wildfowl and Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

Smit, C. & Visser, G. J. M. (1993) Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta area. Wader Study Group Bulletin 68, 6-19.

Stillman, R.A., West, A.D., Caldow, R.W.G. & Durrell, S.E.A. le V. dit (2007) Predicting the effect of disturbance on coastal birds. Ibis 149 (Suppl. 1), 9-14.

Sutherland, W.J. (1998) The effect of change in habitat quality on populations of migratory species. Journal of Applied Ecology 35, 418-421.

Sutherland, W.J. & Crockford, N.J. (1993) Factors affecting the feeding distribution of red-breasted gees *Branta ruficollis* wintering in Romania. Biological Conservation 63, 61-65.

Tuite, C.H., Hansen, P.R. & Owen, M. (1984) Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales, and the influence of water-based recreation. Journal of Applied Ecology 21: 41-62.

West, A.D., Goss-Custard, J.D., Stillman, R.A., Caldow, R.W.G., Durrell, S.E.A. le V. dit & McGorty, S. (2002) Predicting the impacts of disturbance on shorebird mortality using a behaviour-based model. Biological Conservation 106, 319-328.

Websites

www.jncc.gov.uk

www.npws.ie

www.birdwatchireland.ie

www.gov.scot

Appendices

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Appendix 1: Sheets 1 to 24

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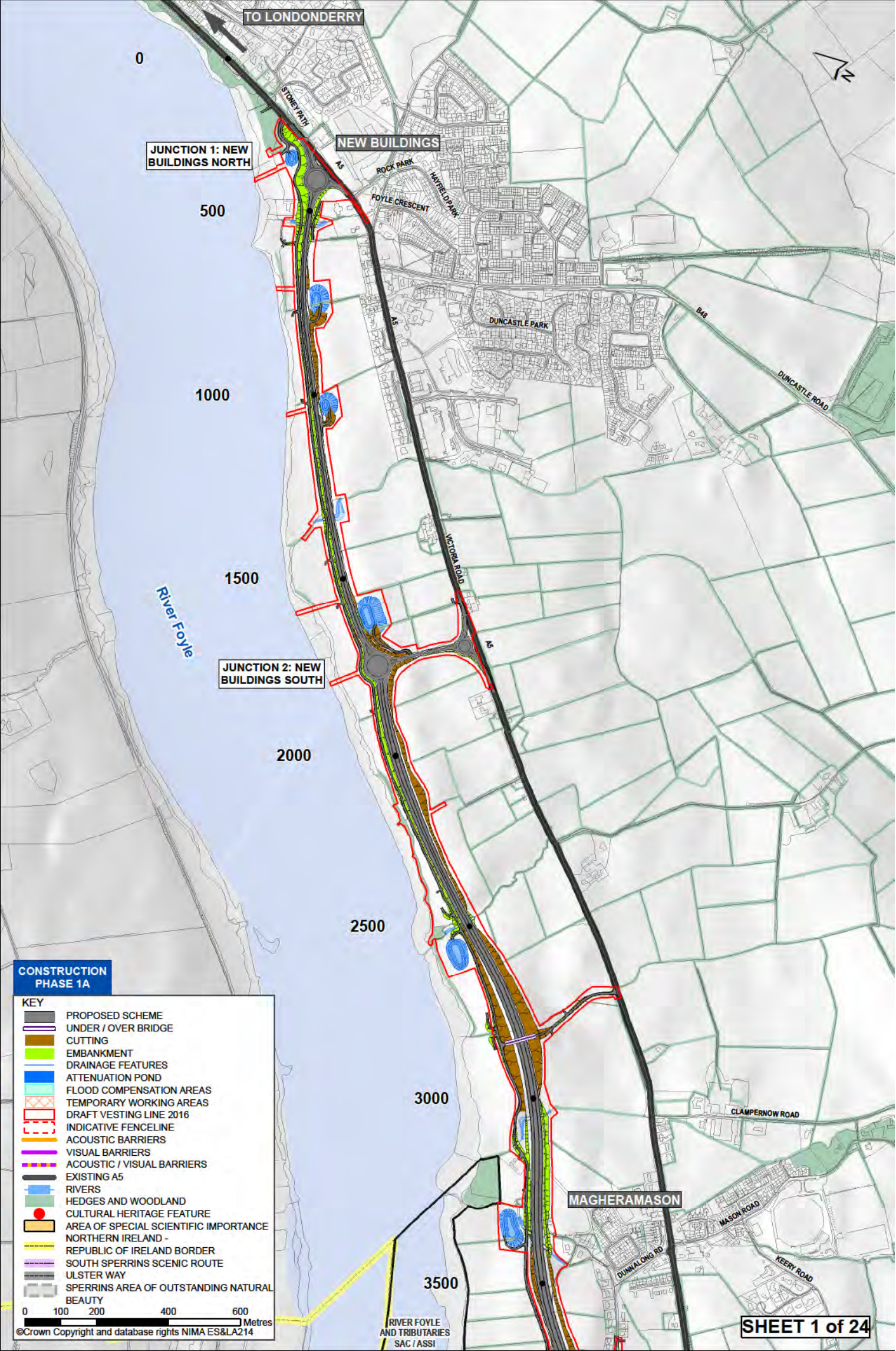
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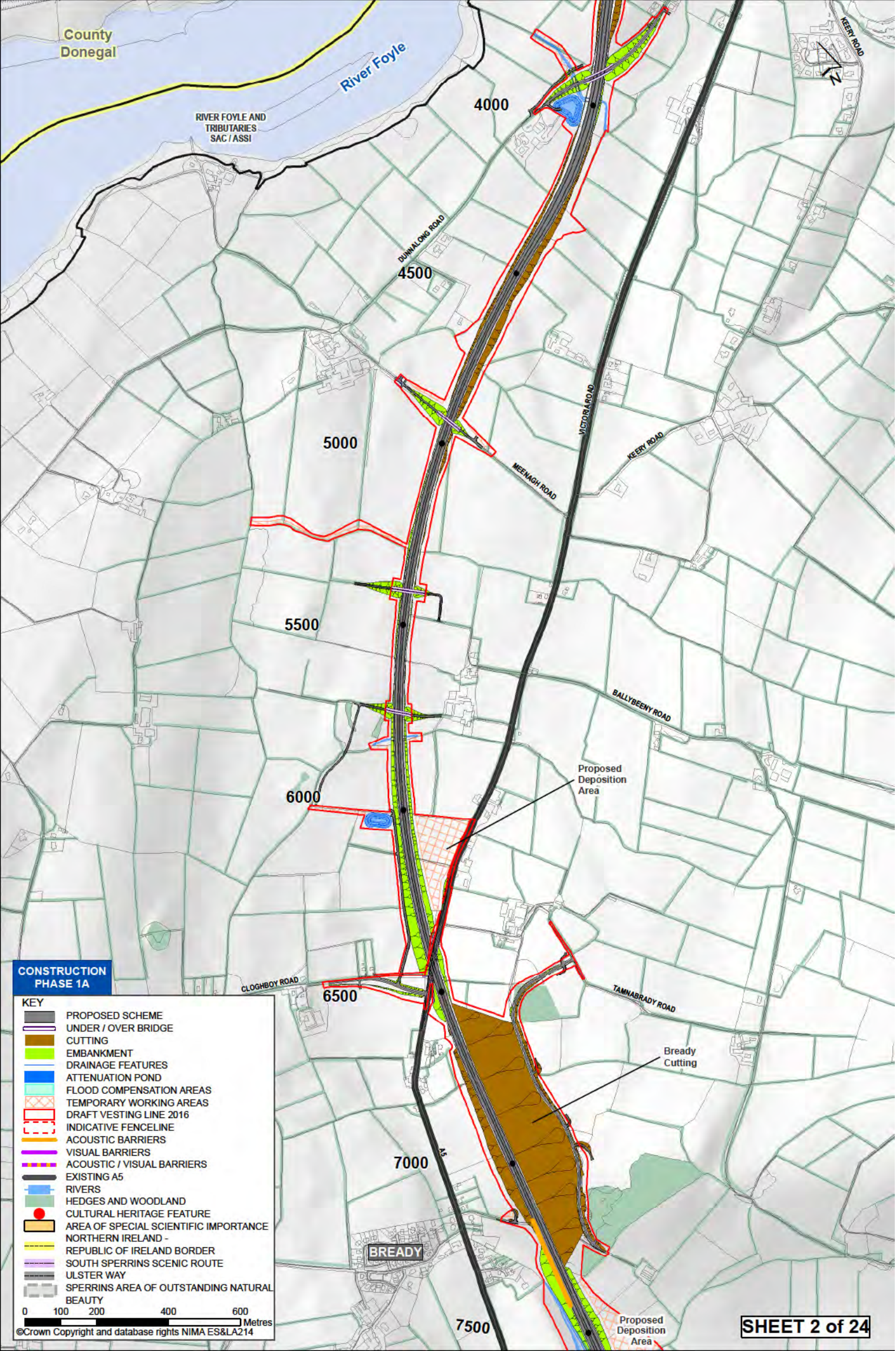
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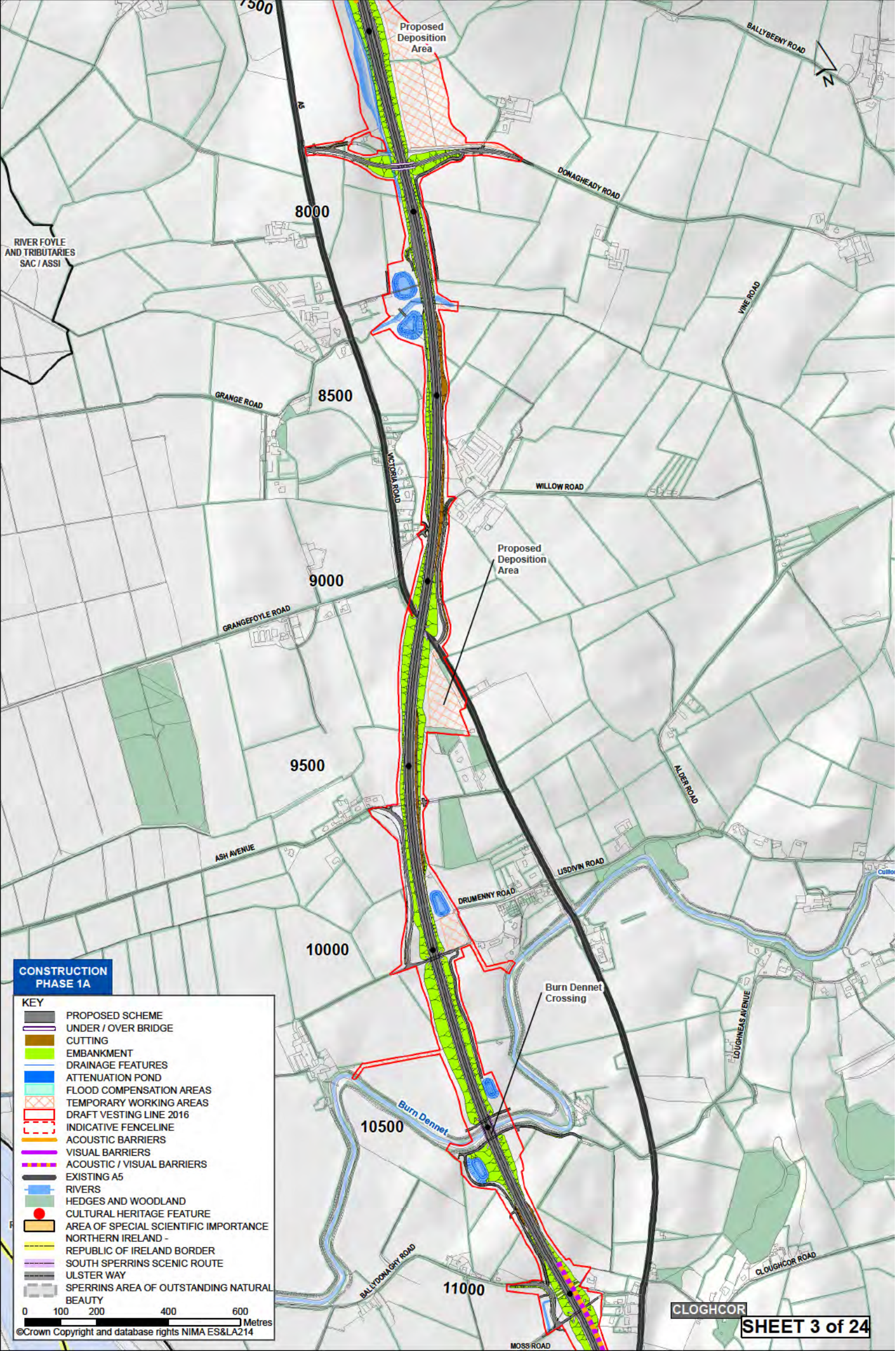
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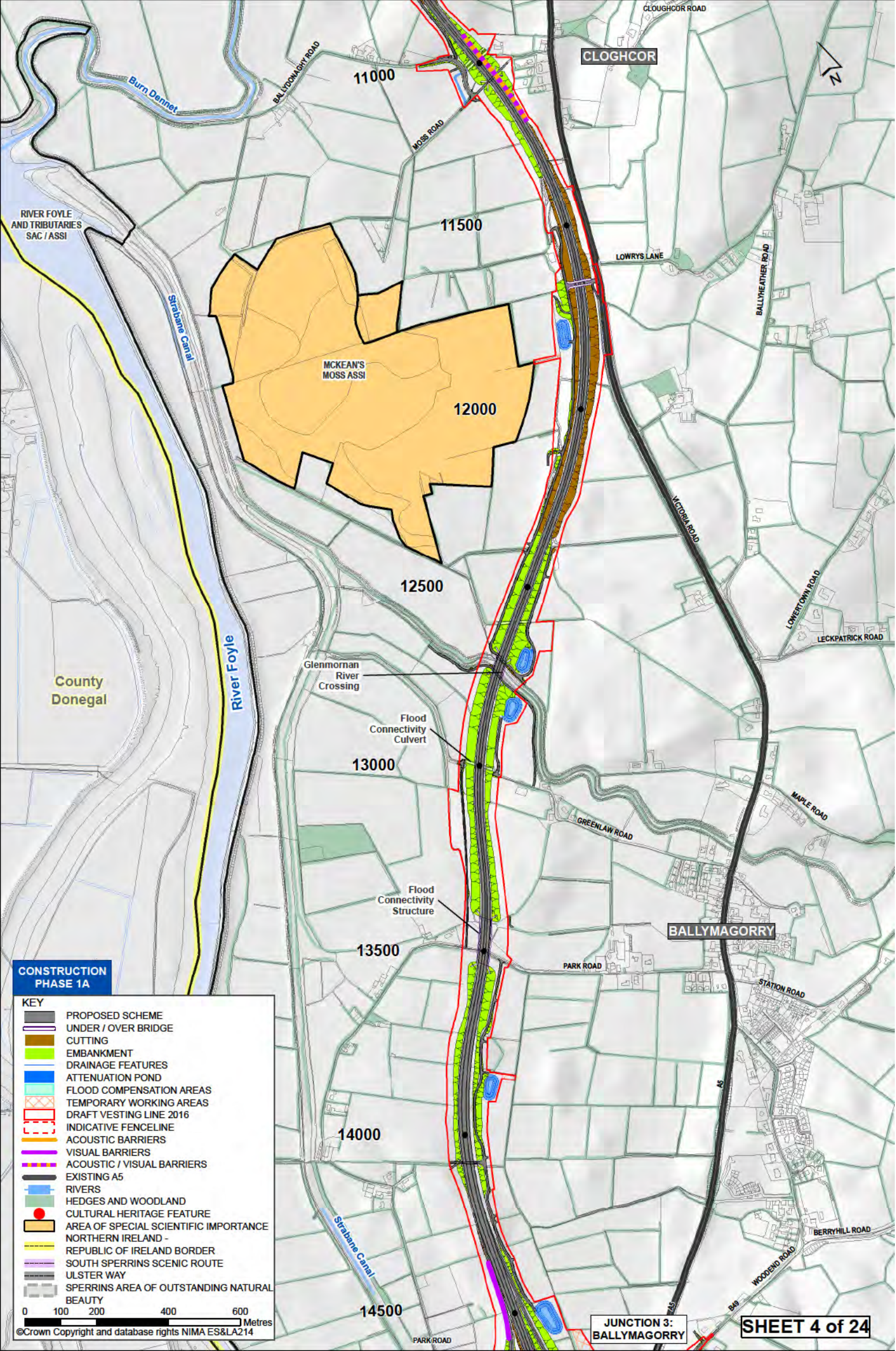

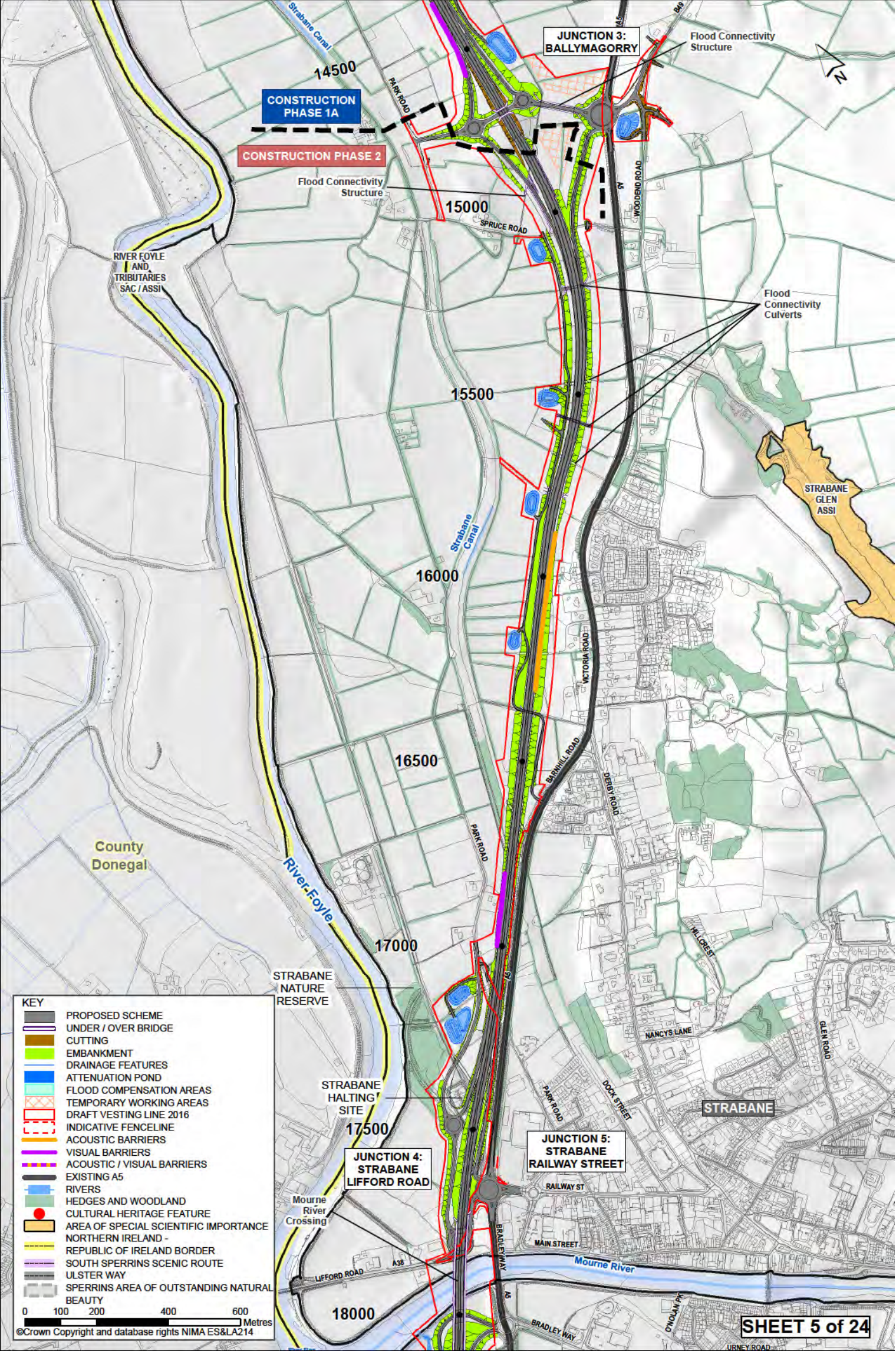
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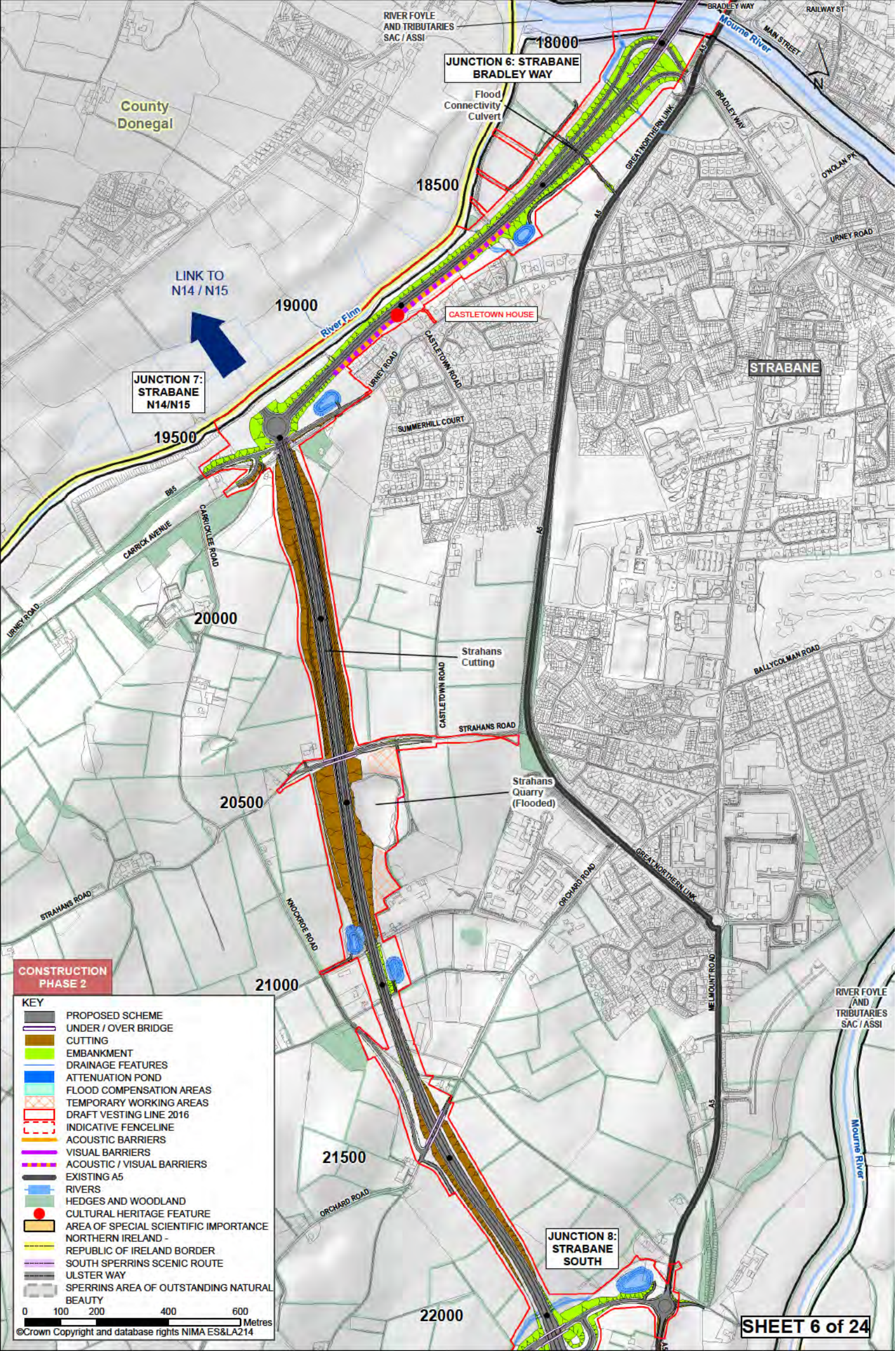

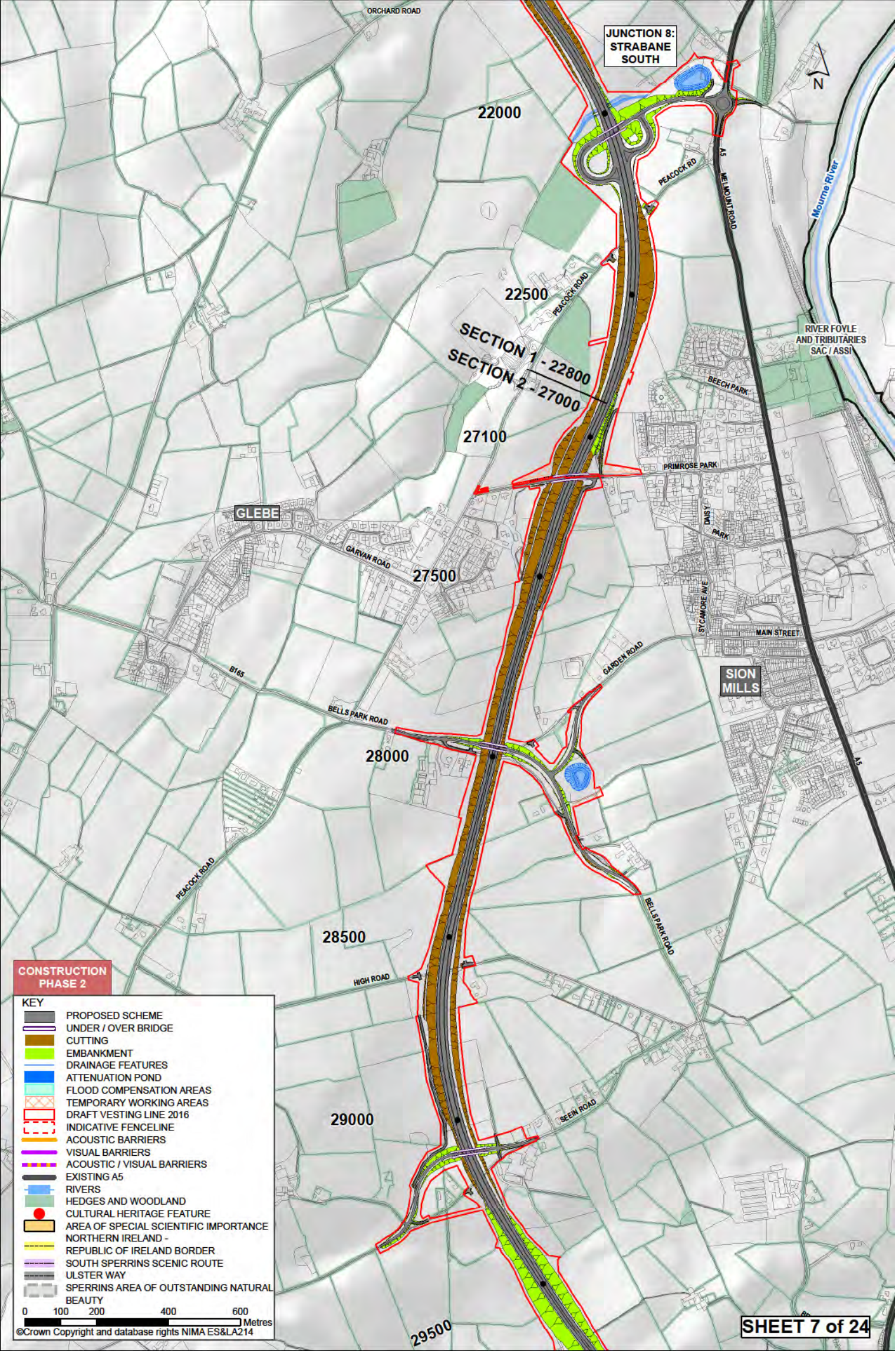
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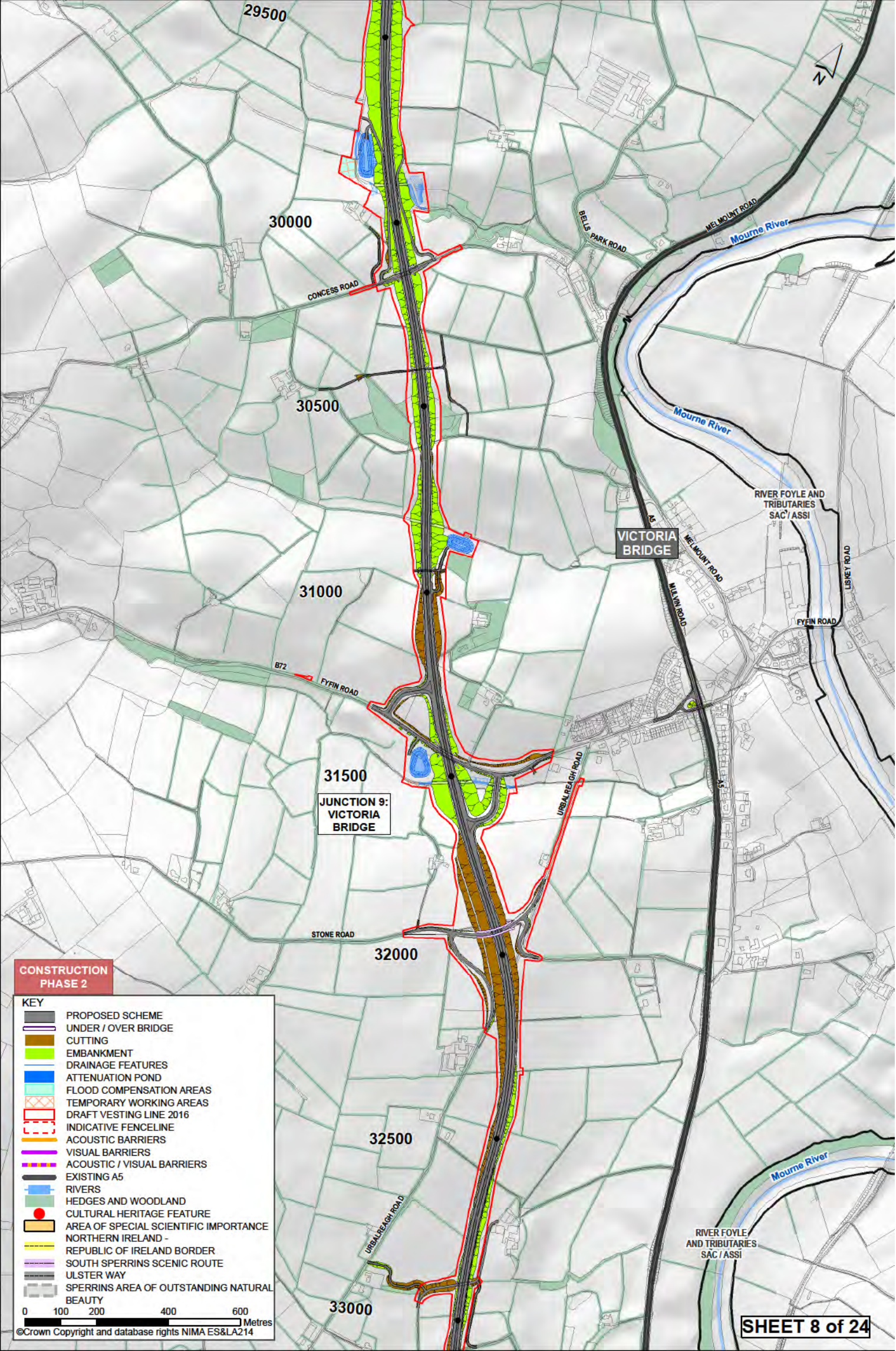
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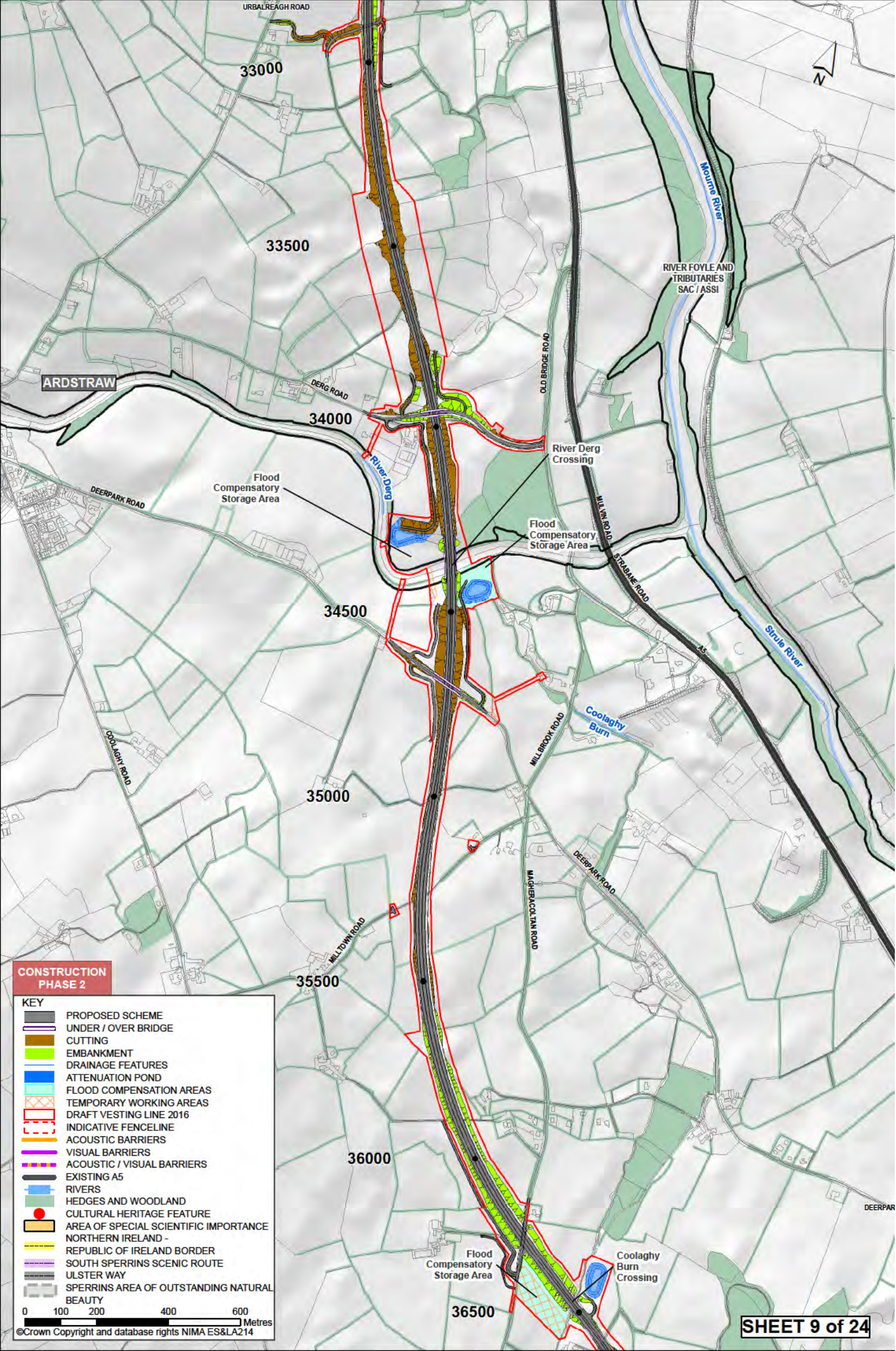
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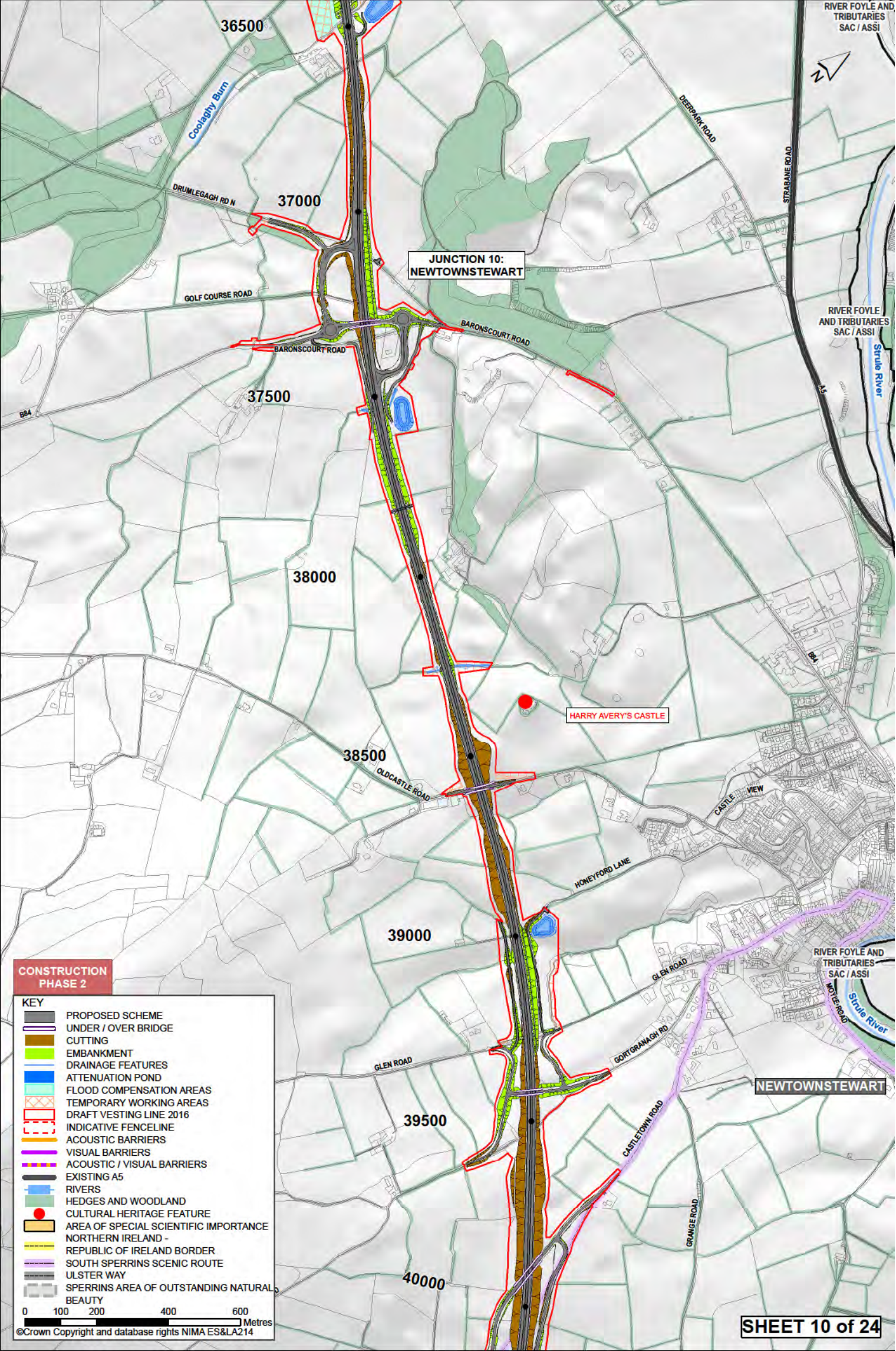
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38000
38500
39000
39500
40000
JUNCTION 10:
NEWTOWNSTEWART
Coolaghy Burn
DRUMLEGAGH RD N
GOLF COURSE ROAD
BARONSCOURT ROAD
BARONSCOURT ROAD
B84
DEERPARK ROAD
STRABANE ROAD
A5
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
B84
HARRY AVERY'S CASTLE
OLDCASTLE ROAD
CASTLE VIEW
HONEYFORD LANE
GLEN ROAD
GLEN ROAD
GORTGRANAGH RD
MOYLE ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
NEWTOWNSTEWART
CASTLETOWN ROAD
GRANGE ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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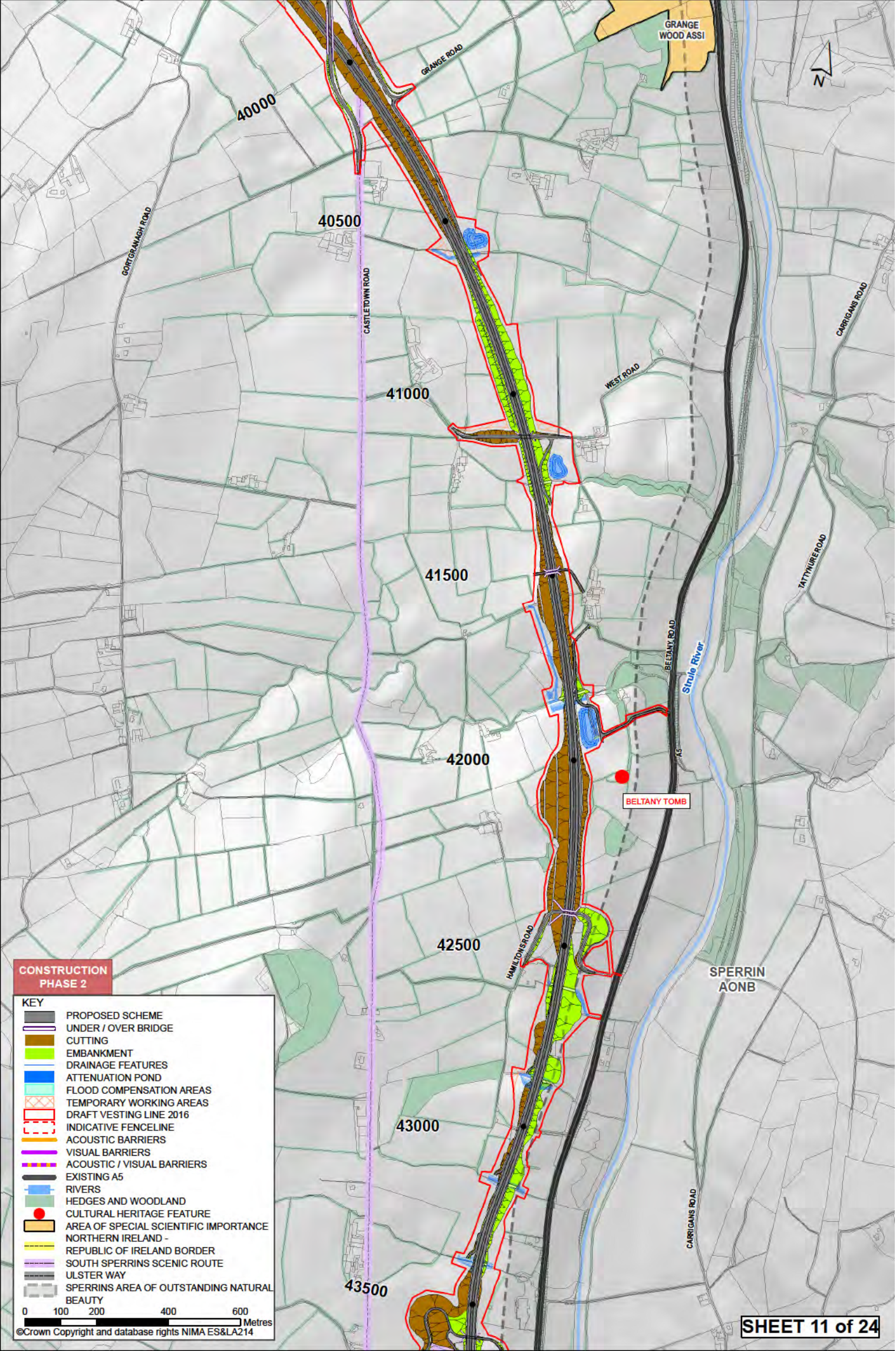
GRANGE WOOD ASSI
GRANGE ROAD
40000
GORTGRANAGH ROAD
40500
CASTLETOWN ROAD
WEST ROAD
41000
CARRIGANS ROAD
41500
TATTYHURE ROAD
BELTANY ROAD
Strule River
A5
42000
BELTANY TOMB
HAMILTONSROAD
42500
SPERRIN AONB
43000
CARRIGANS ROAD
43500
N
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
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SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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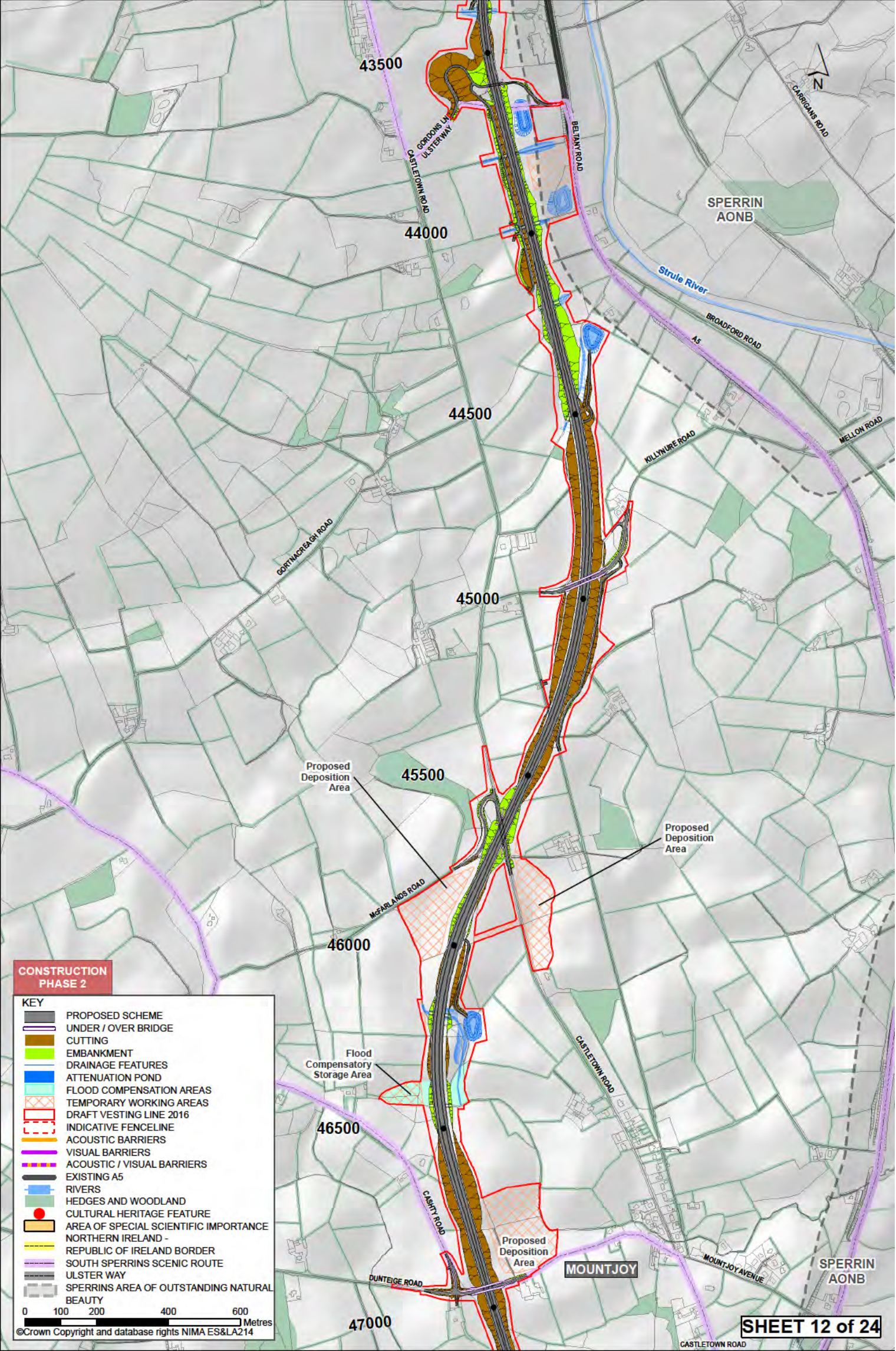
43500
44000
44500
45000
45500
46000
46500
47000
N
SPERRIN AONB
Strule River
BELTANY ROAD
CARRIGANS ROAD
GORDONS LN
ULSTERWAY
CASTLETOWN ROAD
BROADFORD ROAD
A5
KILLYNURE ROAD
MELLON ROAD
GORTNACREAGH ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
McFARLANDS ROAD
Flood Compensatory Storage Area
CASTLETOWN ROAD
CASHTY ROAD
DUNTEIGE ROAD
MOUNTJOY
MOUNTJOY AVENUE
SPERRIN AONB
CASTLETOWN ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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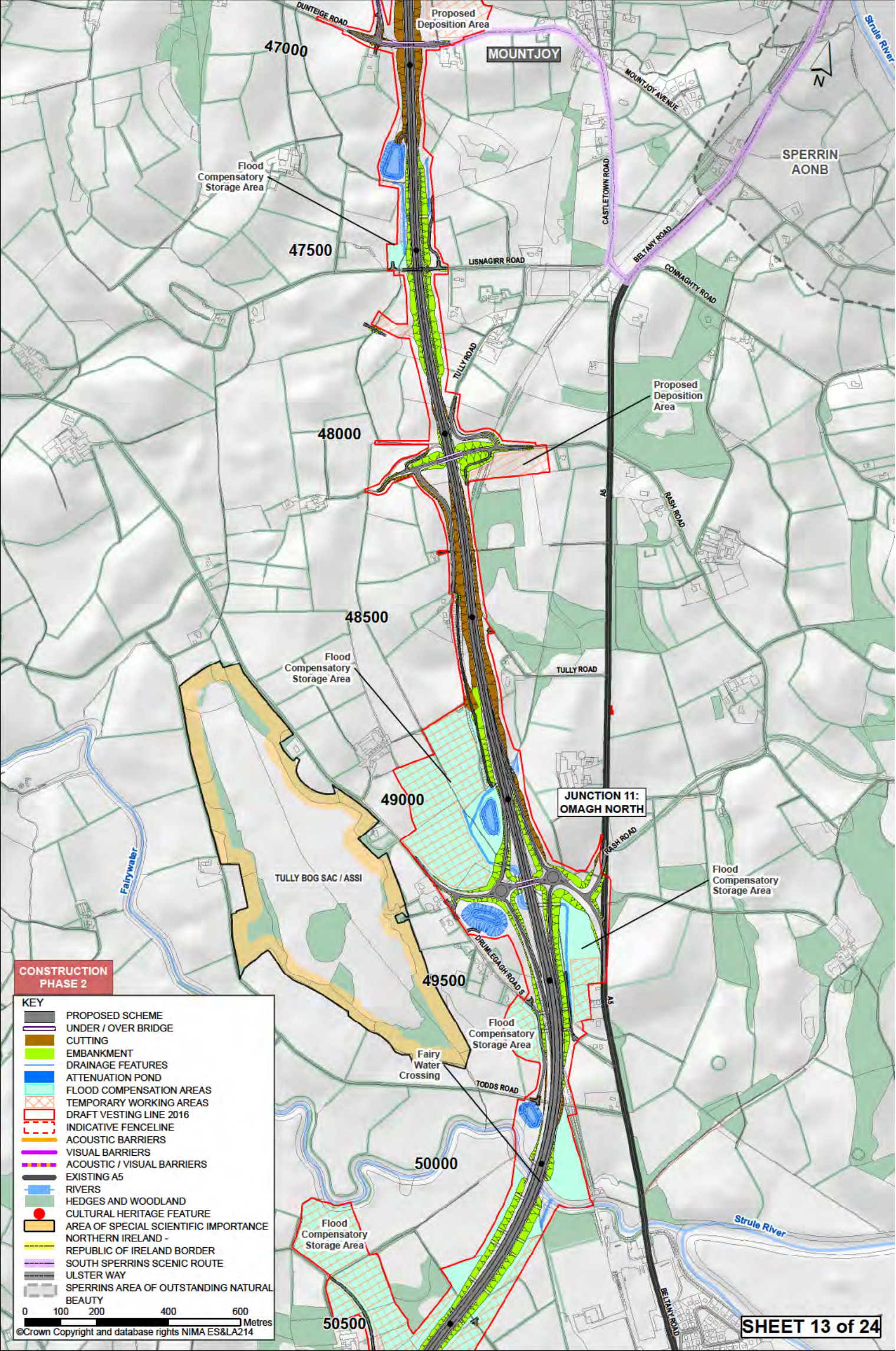
DUNTEIGE ROAD
Proposed Deposition Area
MOUNTJOY
MOUNTJOY AVENUE
Strule River
N
47000
Flood Compensatory Storage Area
SPERRIN AONB
CASTLETOWN ROAD
BELTANY ROAD
47500
LISNAGIRR ROAD
CONNAGHTY ROAD
TULLY ROAD
Proposed Deposition Area
48000
A5
RASH ROAD
48500
Flood Compensatory Storage Area
TULLY ROAD
JUNCTION 11: OMAGH NORTH
49000
RASH ROAD
Fairywater
TULLY BOG SAC / ASSI
Flood Compensatory Storage Area
DRUMLEGAGH ROAD S
49500
A5
Flood Compensatory Storage Area
Fairy Water Crossing
TODDS ROAD
50000
Flood Compensatory Storage Area
Strule River
BELTANY ROAD
50500
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
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ULSTER WAY
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Metres
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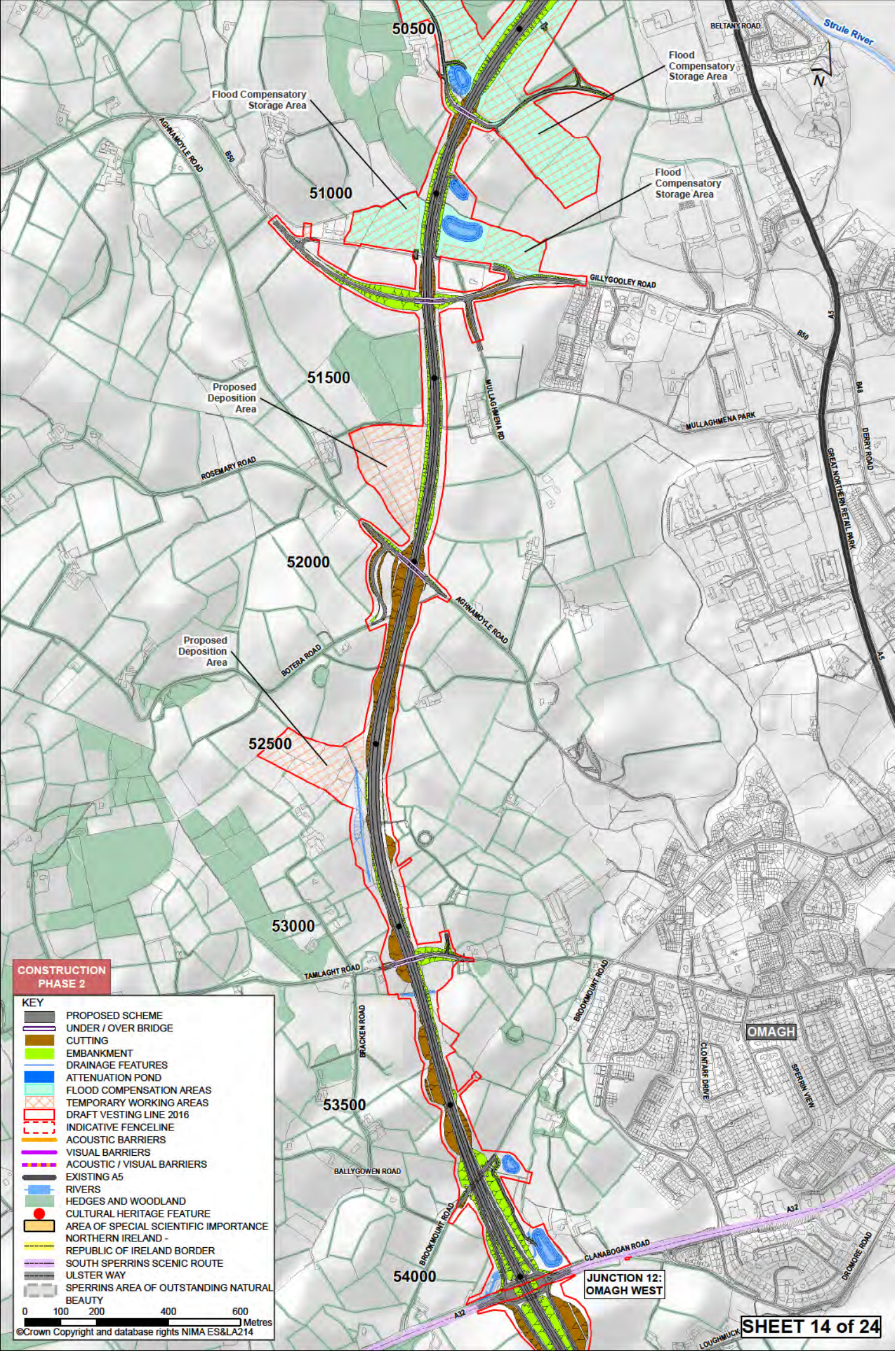
50500
51000
51500
52000
52500
53000
53500
54000
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Proposed Deposition Area
Proposed Deposition Area
AGHNAMOYLE ROAD
B50
BELTANY ROAD
Strule River
N
GILLYGOOLEY ROAD
B50
A5
B48
MULLAGHMENA RD
MULLAGHMENA PARK
DERRY ROAD
GREAT NORTHERN RETAIL PARK
ROSEMARY ROAD
AGHNAMOYLE ROAD
BOTERA ROAD
TAMLAGHT ROAD
BRACKEN ROAD
BROOKMOUNT ROAD
OMAGH
CLONTARF DRIVE
SPERRIN VIEW
BALLYGOWEN ROAD
BROOKMOUNT ROAD
A32
CLANABOGAN ROAD
DROMORE ROAD
JUNCTION 12: OMAGH WEST
A32
LOUGHMUCK
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
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ULSTER WAY
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Metres
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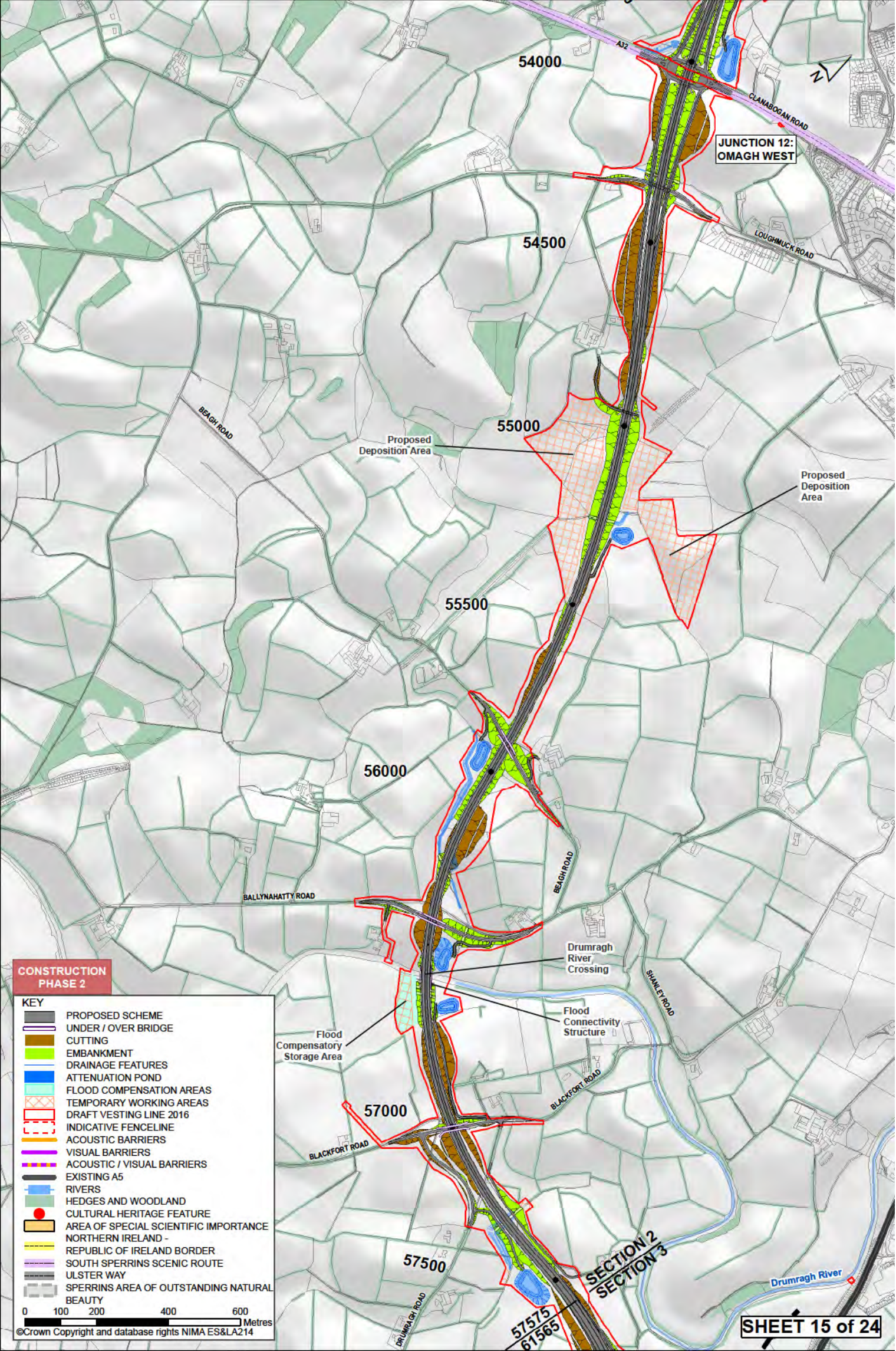
54000
54500
55000
55500
56000
57000
57500
A32
CLANABOGAN ROAD
JUNCTION 12:
OMAGH WEST
LOUGHMUCK ROAD
BEAGH ROAD
Proposed
Deposition Area
Proposed
Deposition
Area
BALLYNAHATTY ROAD
BEAGH ROAD
Drumragh
River
Crossing
SHANLEY ROAD
Flood
Connectivity
Structure
Flood
Compensatory
Storage Area
BLACKFORT ROAD
BLACKFORT ROAD
SECTION 2
SECTION 3
Drumragh River
DRUMRAGH ROAD
57575
61565
CONSTRUCTION
PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
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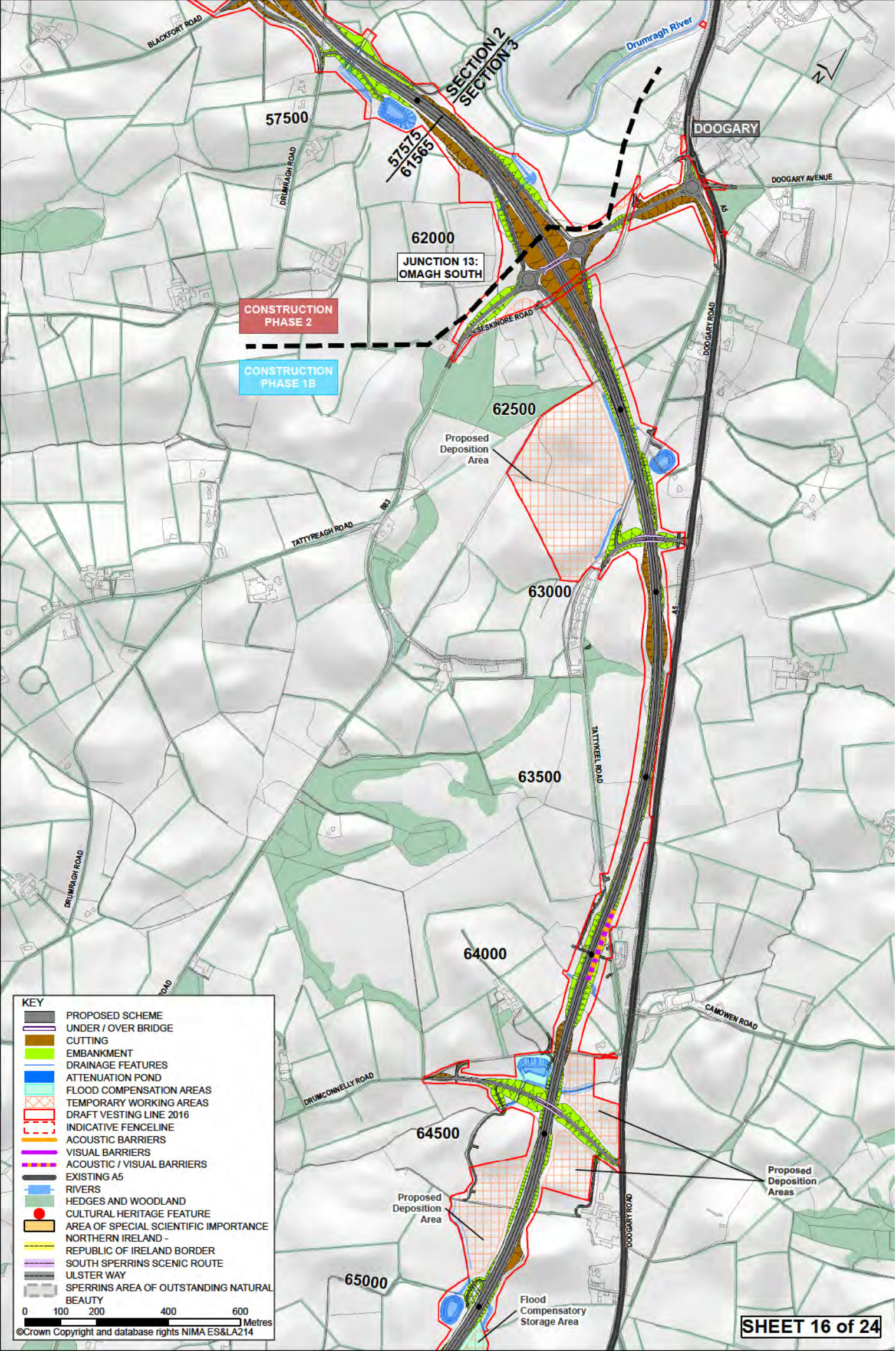
BLACKFORT ROAD
Drumragh River
SECTION 2
SECTION 3
57500
57575
61565
DRUMRAGH ROAD
DOOGARY
DOOGARY AVENUE
62000
JUNCTION 13:
OMAGH SOUTH
CONSTRUCTION
PHASE 2
CONSTRUCTION
PHASE 1B
SESKINORE ROAD
DOOGARY ROAD
62500
Proposed
Deposition
Area
TATTYREAGH ROAD
B83
63000
A5
TATTYKEEL ROAD
63500
DRUMRAGH ROAD
64000
CAMOWEN ROAD
DRUMCONNELLY ROAD
64500
Proposed
Deposition
Areas
Proposed
Deposition
Area
DOOGARY ROAD
65000
Flood
Compensatory
Storage Area
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
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SPERRINS AREA OF OUTSTANDING NATURAL
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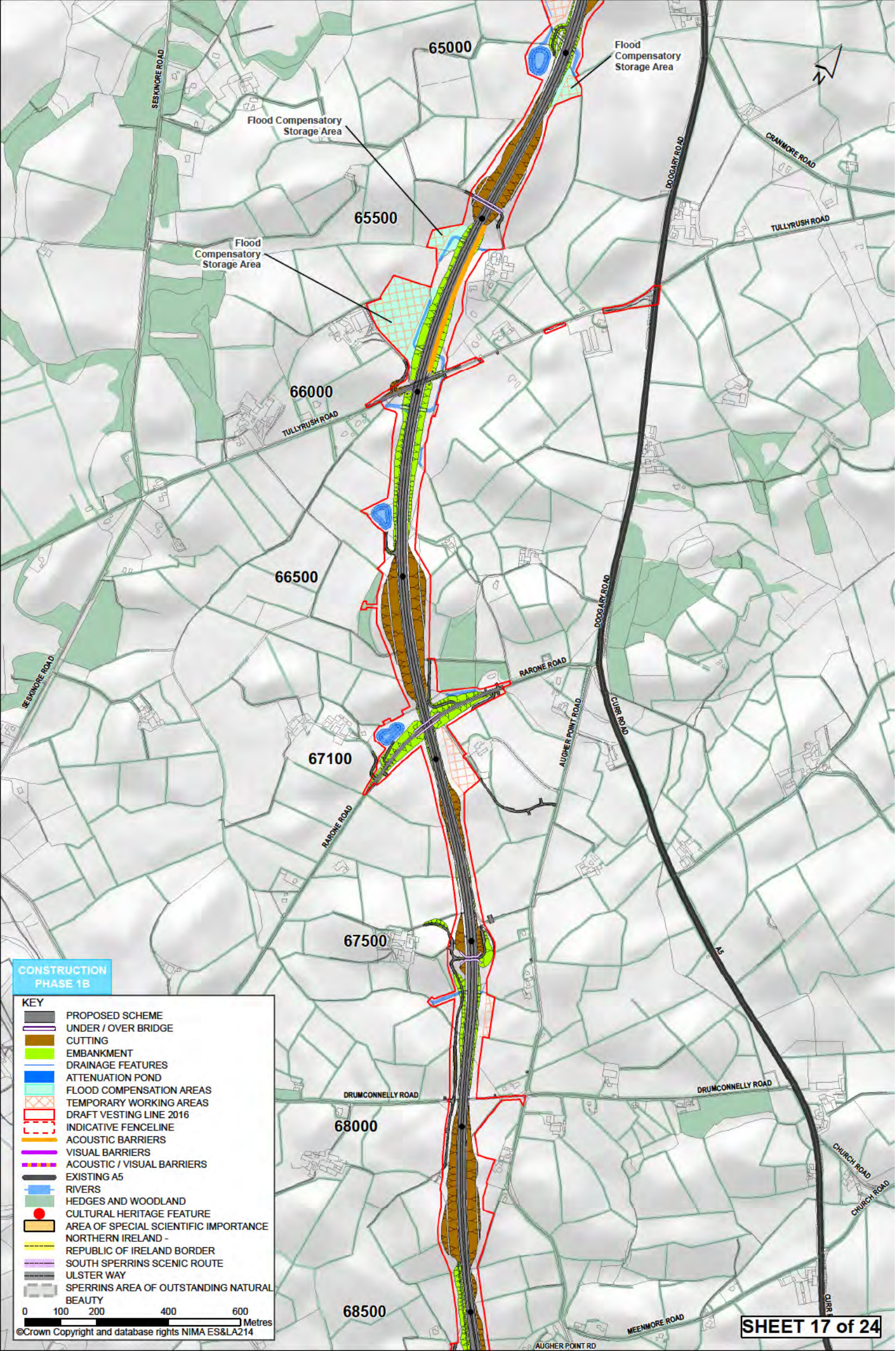
65000
65500
66000
66500
67100
67500
68000
68500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
SESKINORE ROAD
SESKINORE ROAD
TULLYRUSH ROAD
TULLYRUSH ROAD
CRANMORE ROAD
DOOGARY ROAD
DOOGARY ROAD
RARONE ROAD
RARONE ROAD
AUGHER POINT ROAD
CURR ROAD
A5
DRUMCONNELLY ROAD
DRUMCONNELLY ROAD
CHURCH ROAD
CHURCH ROAD
MEENMORE ROAD
AUGHER POINT RD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
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SOUTH SPERRINS SCENIC ROUTE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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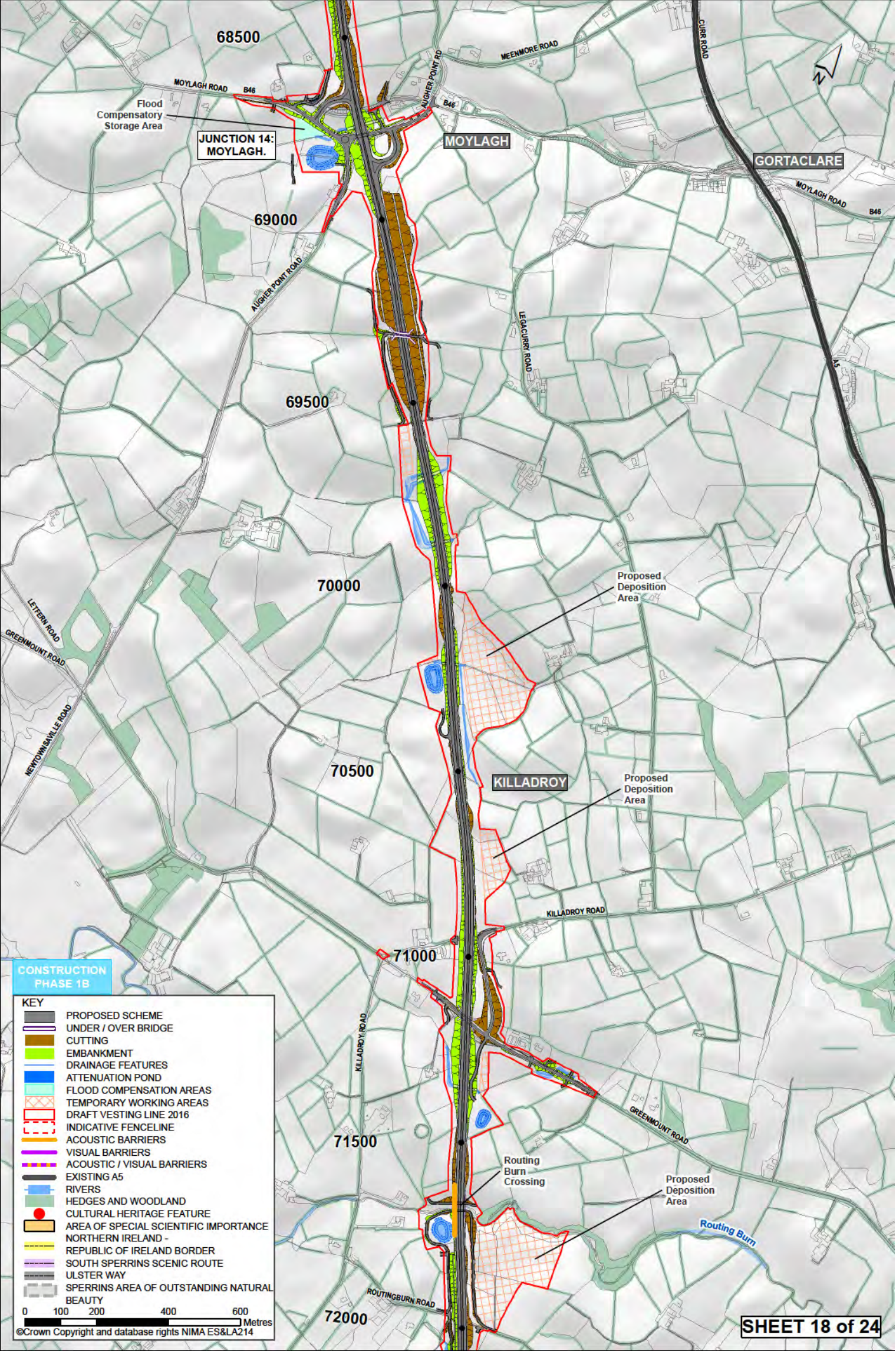

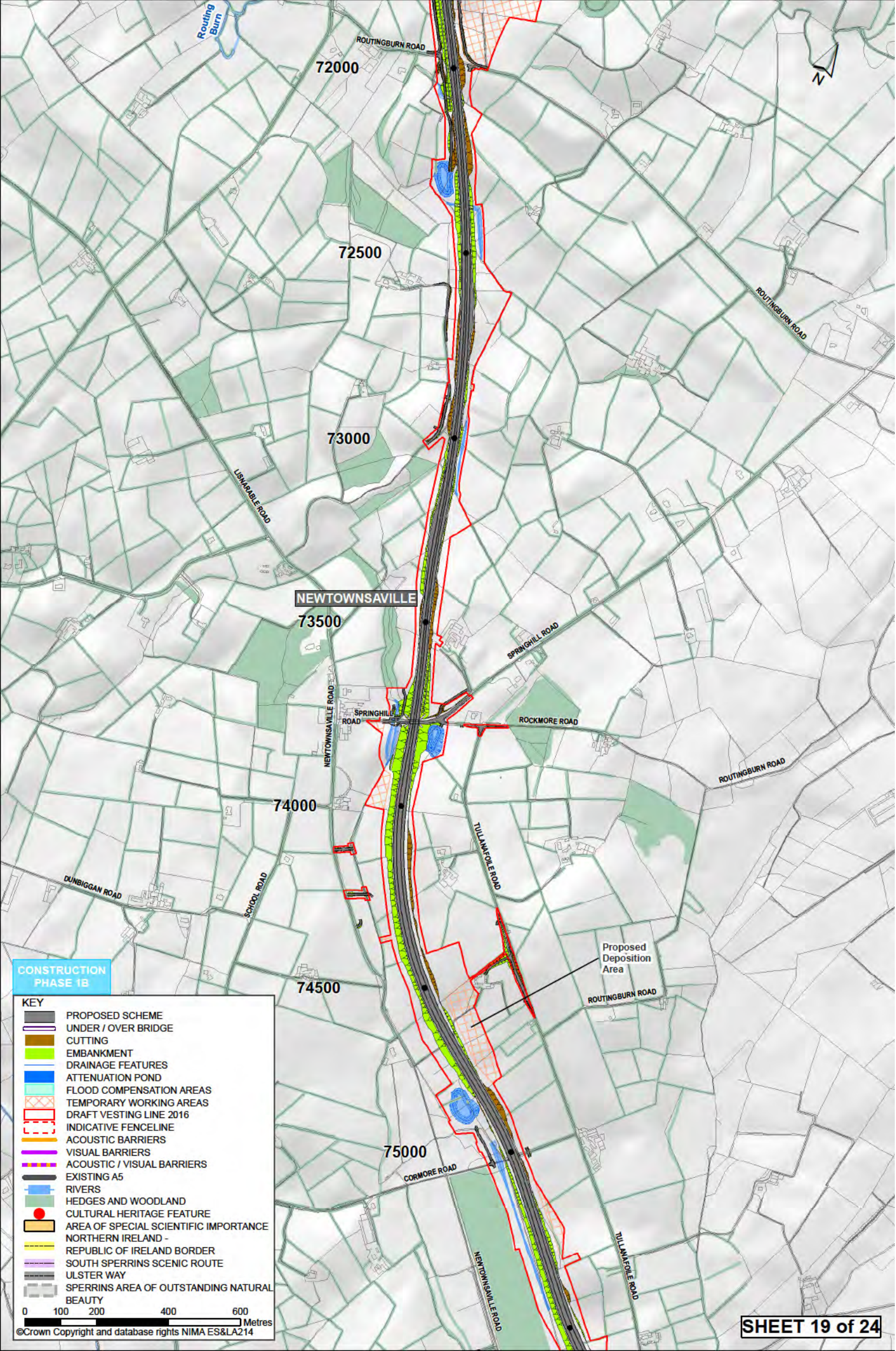
Routing Burn
ROUTINGBURN ROAD
72000
72500
73000
73500
74000
74500
75000
N
LISNARABLE ROAD
NEWTOWNSAVILLE
SPRINGHILL ROAD
NEWTOWNSAVILLE ROAD
SPRINGHILL ROAD
ROCKMORE ROAD
ROUTINGBURN ROAD
TULLANAFOILE ROAD
DUNBIGGAN ROAD
SCHOOL ROAD
Proposed Deposition Area
ROUTINGBURN ROAD
CORMORE ROAD
NEWTOWNSAVILLE ROAD
TULLANAFOILE ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
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SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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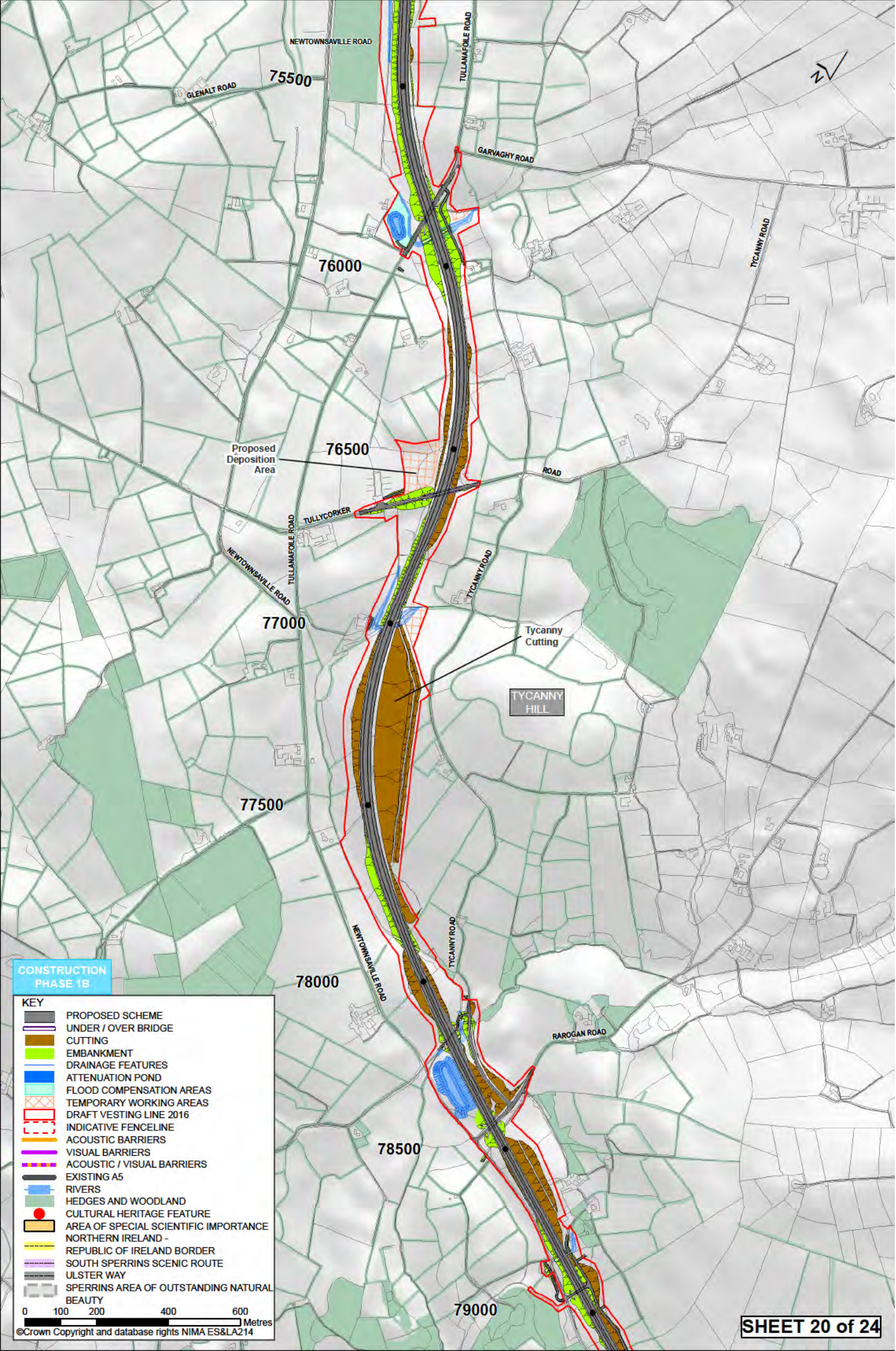
NEWTOWNSAVILLE ROAD
GLENALT ROAD
75500
TULLANAFOILE ROAD
GARVAGHY ROAD
TYCANNY ROAD
76000
Proposed Deposition Area
76500
ROAD
TULLYCORKER
TULLANAFOILE ROAD
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
77000
Tycanny Cutting
TYCANNY HILL
77500
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
78000
RAROGAN ROAD
78500
79000
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
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ULSTER WAY
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Metres
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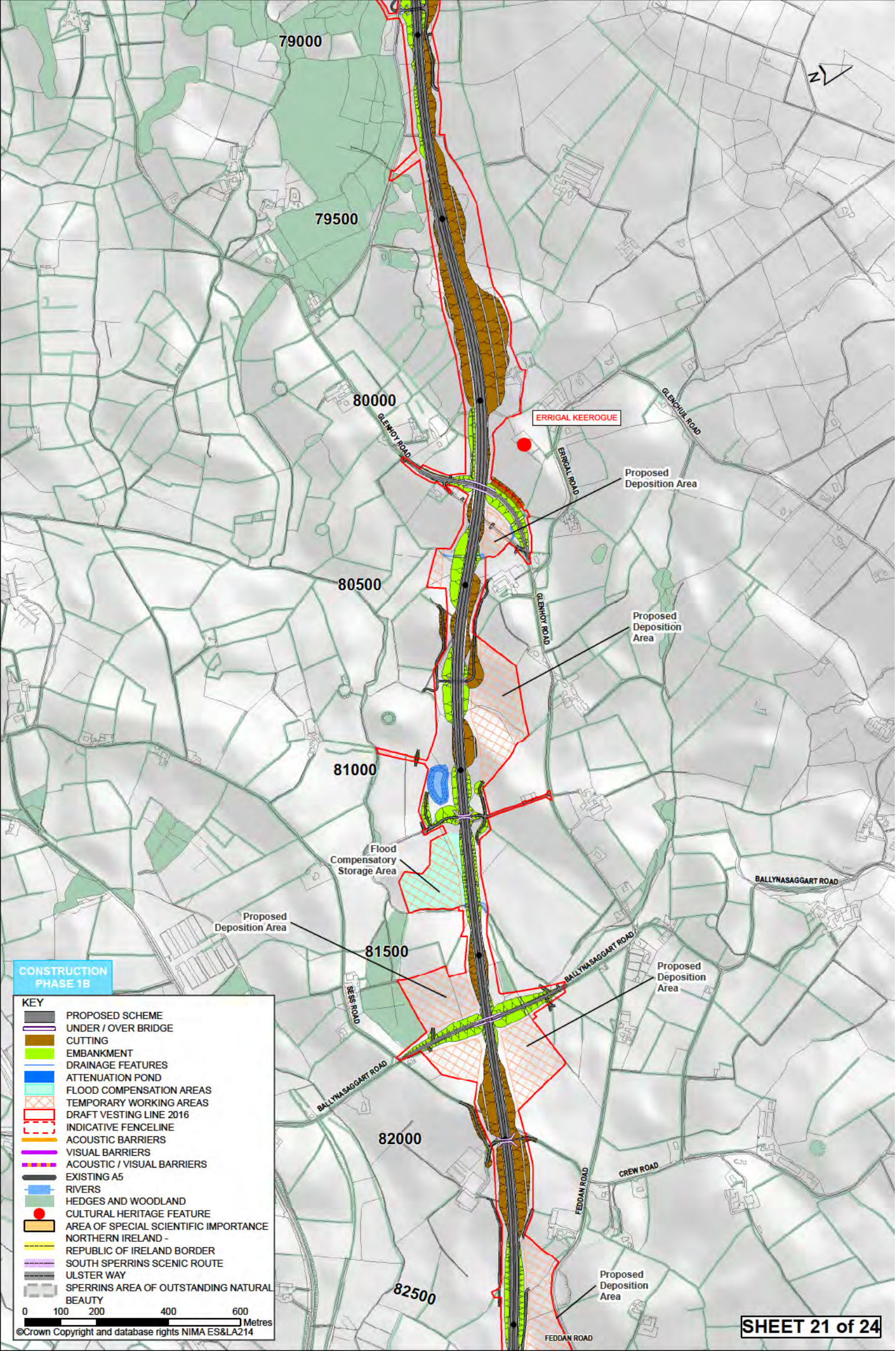
79000
79500
80000
80500
81000
81500
82000
82500
N
ERRIGAL KEEROGUE
GLEMOY ROAD
ERRIGAL ROAD
GLENCHUIL ROAD
GLENHOY ROAD
Proposed Deposition Area
Proposed Deposition Area
Flood Compensatory Storage Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
SESS ROAD
CREW ROAD
FEDDAN ROAD
FEDDAN ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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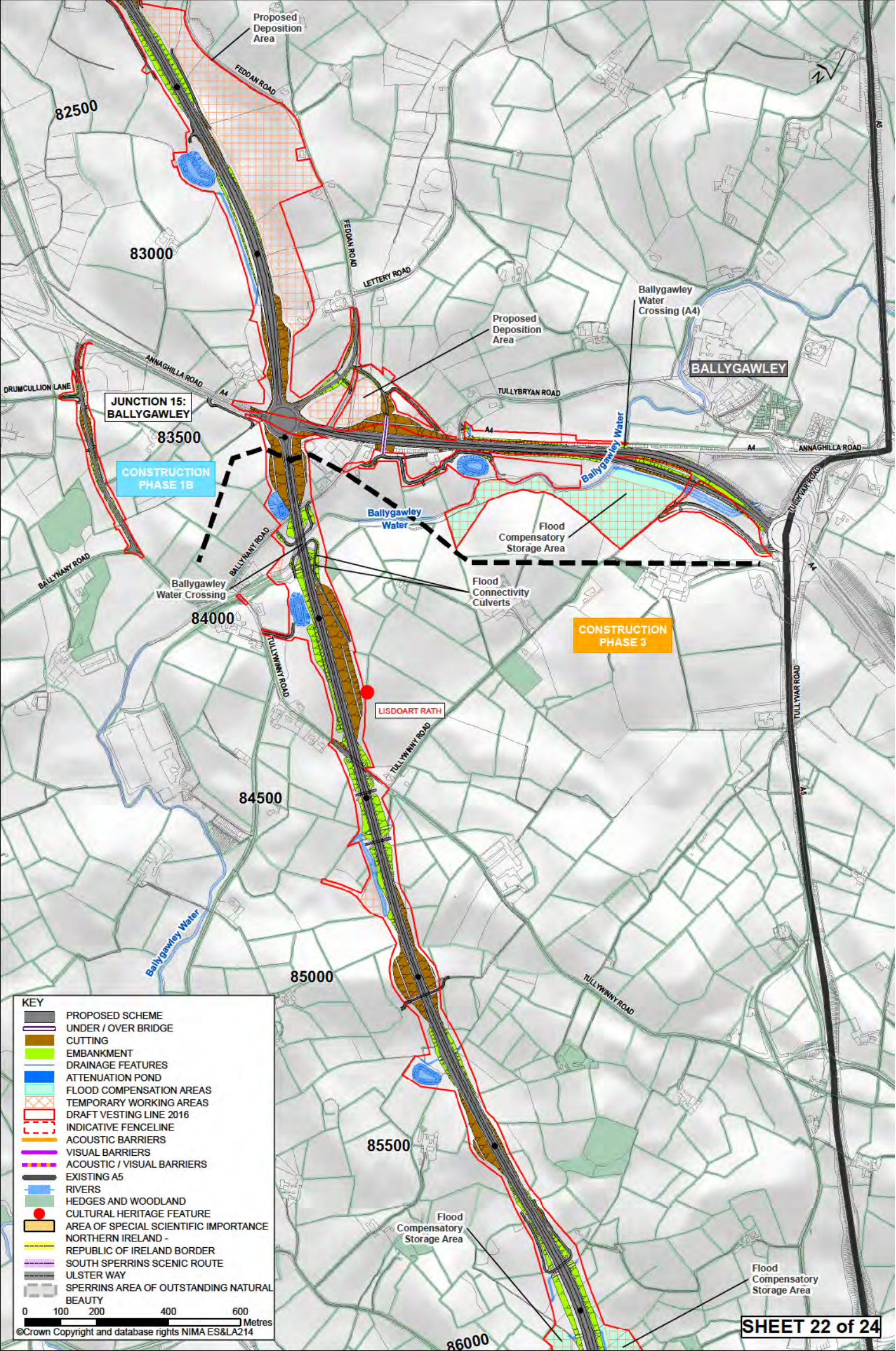
Proposed Deposition Area
FEDDAN ROAD
82500
83000
LETTERY ROAD
Ballygawley Water Crossing (A4)
Proposed Deposition Area
BALLYGAWLEY
ANNAGHILLA ROAD
A4
DRUMCULLION LANE
JUNCTION 15: BALLYGAWLEY
TULLYBRYAN ROAD
83500
CONSTRUCTION PHASE 1B
Ballygawley Water
ANNAGHILLA ROAD
TULLYVAR ROAD
Flood Compensatory Storage Area
BALLYNANY ROAD
Ballygawley Water Crossing
Flood Connectivity Culverts
84000
CONSTRUCTION PHASE 3
TULLYWINNY ROAD
LISDOART RATH
84500
A5
85000
85500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
86000
N
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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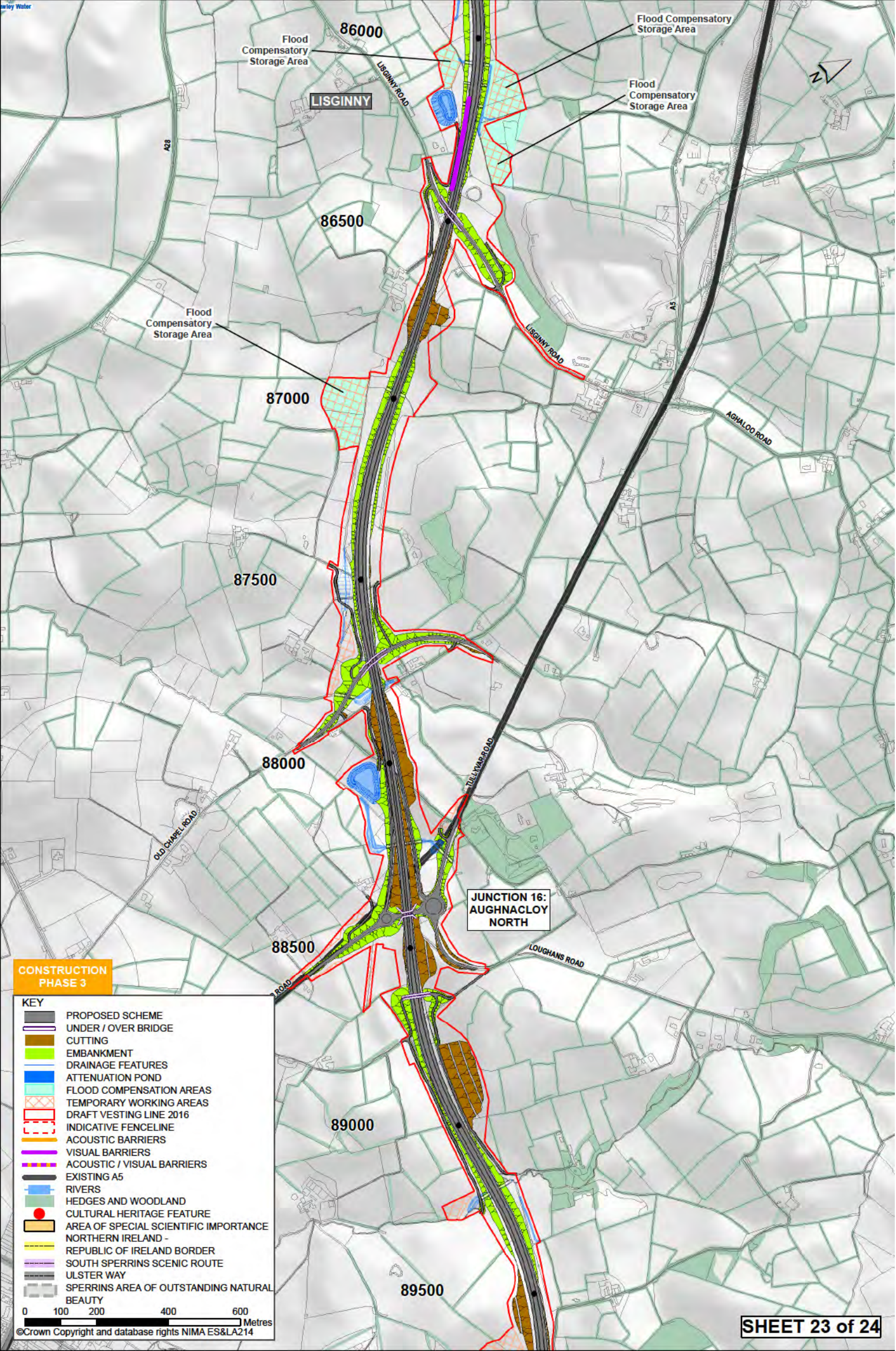
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
LISGINNY
LISGINNY ROAD
A28
A5
86000
86500
87000
87500
88000
88500
89000
89500
AGHALOO ROAD
TULLYVARRAN ROAD
OLD CHAPEL ROAD
LOUGHANS ROAD
JUNCTION 16: AUGHNACLOY NORTH
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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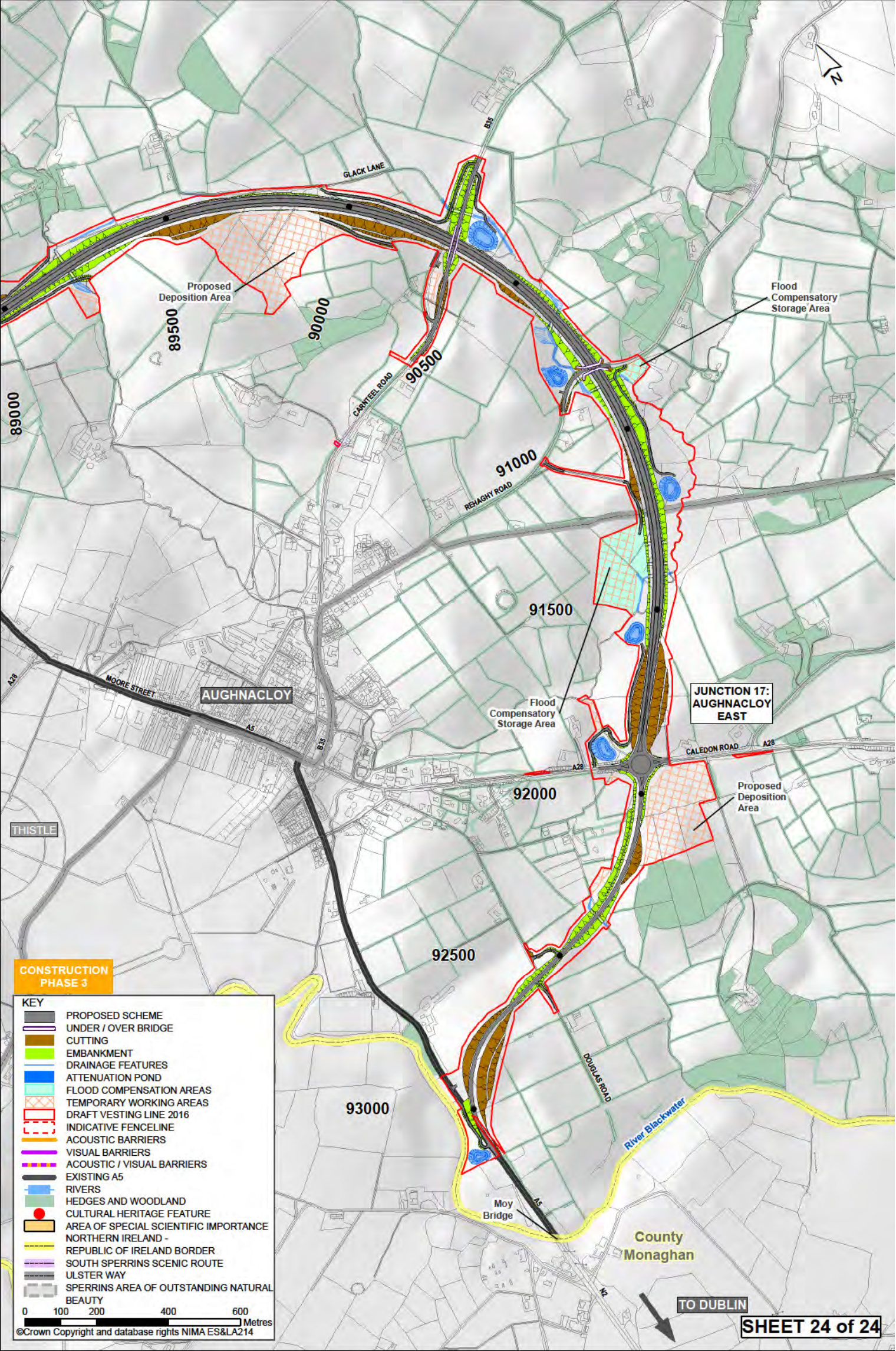
GLACK LANE
B35
Proposed Deposition Area
89500
90000
90500
89000
CARNTEEL ROAD
Flood Compensatory Storage Area
91000
REHAGHY ROAD
91500
AUGHNACLOY
MOORE STREET
A28
A5
B35
Flood Compensatory Storage Area
JUNCTION 17: AUGHNACLOY EAST
CALEDON ROAD
A28
A28
92000
Proposed Deposition Area
THISTLE
92500
DOUGLAS ROAD
River Blackwater
93000
Moy Bridge
A5
County Monaghan
N2
TO DUBLIN
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
©Crown Copyright and database rights NIMA ES&LA214
SHEET 24 of 24

Appendix 1 – Figures 1 to 3

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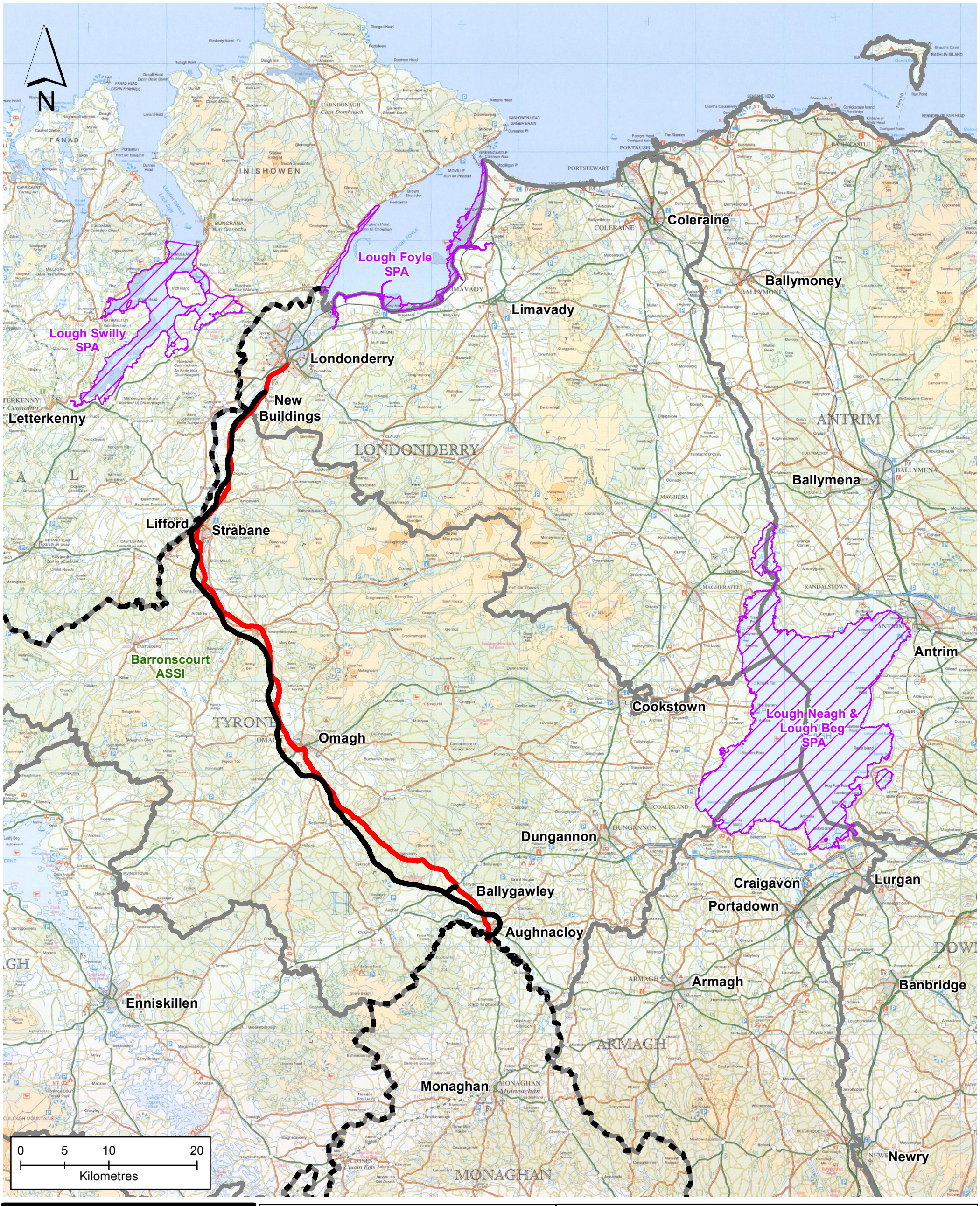


Client: ROADS Service

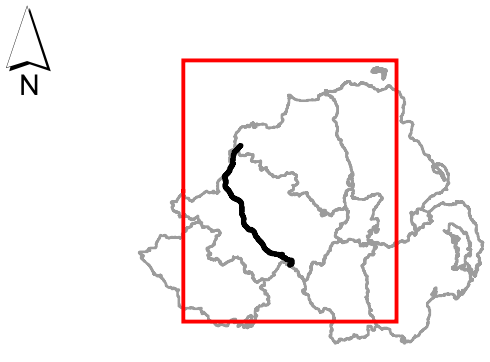
Project: A5WTC

mouchel building great relationships

Drawing Title: Report on Information to Inform an Appropriate Assessment: SPAs
SPA relationship to A5WTC

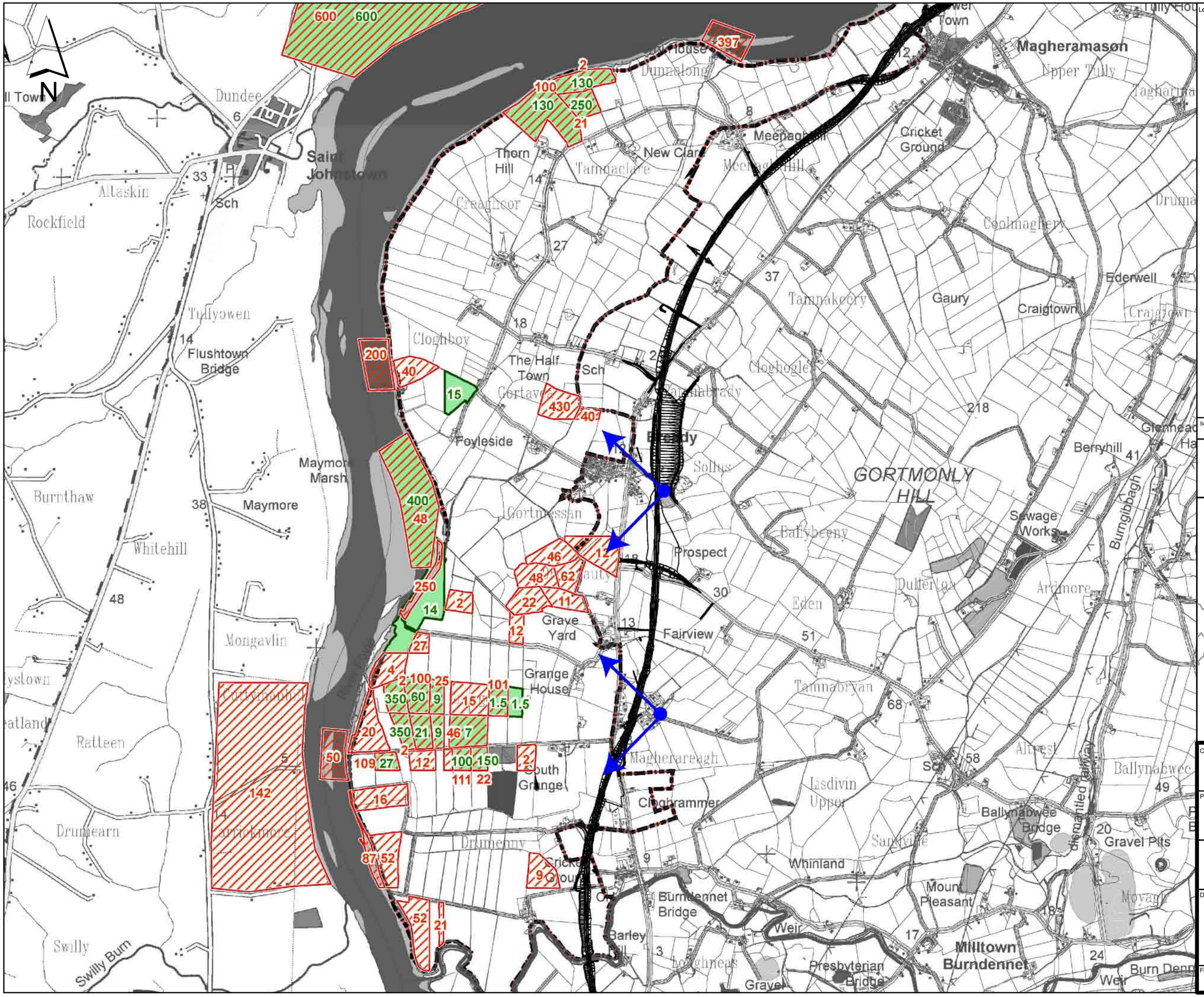
Figure No: Figure 1

Version: A



Legend

- Existing A5
- Proposed Scheme
- Border
- County Boundaries
- Special Protection Area (SPA)



Legend

PROPOSED SCHEME

BIRDS SPECIES AND COUNTS

10 WHOOPER SWAN

10 GREYLAG GOOSE

BIRD HABITAT BOUNDARY

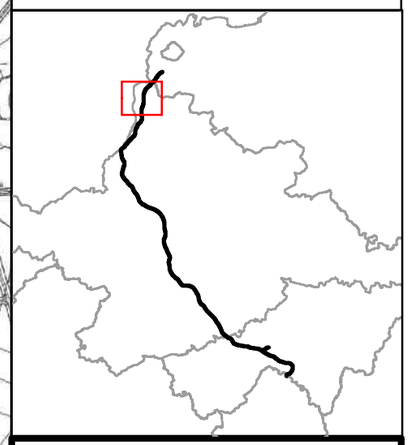
VIEWING POINT FROM

0 0.5 1

SCALE: 1:25,000 KILOMETRES

Scale @A3

1:25,000



Client

transportni

Project

A5 WTC

mouchel

building great relationships

Drawing Title

ENVIRONMENTAL STATEMENT

WHOOPER SWAN AND GREYLAG RESULTS (PEAK COUNTS-2010)

Figure No

FIGURE 2 (ES FIGURE 11.67)

Version

A

N

WS: 1

WS: 21 / GL: 1

WS: 35

WS: 205

WS: 70 / GL: 2

WS: 74 / GL: 65

WS: 489 / GL: 151

Legend

PROPOSED SCHEME

AREAS AND PEAK COUNTS (WS = WHOOPER SWAN, GL = GREYLAG GOOSE)

APPROXIMATE AREA COVERED BY SURVEY

SURVEY VANTAGE POINTS

Scale @A3

1:25,000

Client

transportni

Project

A5 WTC Western Transport Corridor

mouchel building great relationships

Drawing Title

ENVIRONMENTAL STATEMENT

WHOOPER SWAN AND GREYLAG RESULTS (PEAK COUNTS)

Figure No

FIGURE 3 (ES FIGURE 11.68)

Version

B

Appendix 2: Natura 2000 Site Feature Objectives

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Table A2.1 Lough Foyle SPA Feature Objectives

Table A2.1 Lough Foyle SPA Feature Objectives	
Feature	**Component Objective**
Bewick's swan wintering population	No significant decrease in population against national trends, caused by on-site factors
Whooper swan wintering population	No significant decrease in population against national trends, caused by on-site factors
Golden plover wintering population	No significant decrease in population against national trends, caused by on-site factors
Bar-tailed godwit wintering population	No significant decrease in population against national trends, caused by on-site factors
Light-bellied brent goose wintering population	No significant decrease in population against national trends, caused by on-site factors
Great crested grebe wintering population	No significant decrease in population against national trends, caused by on-site factors
Cormorant wintering population	No significant decrease in population against national trends, caused by on-site factors
Greylag goose wintering population	No significant decrease in population against national trends, caused by on-site factors
Shelduck wintering population	No significant decrease in population against national trends, caused by on-site factors
Wigeon wintering population	No significant decrease in population against national trends, caused by on-site factors
Teal wintering population	No significant decrease in population against national trends, caused by on-site factors
Mallard wintering population	No significant decrease in population against national trends, caused by on-site factors
Eider wintering population	No significant decrease in population against national trends, caused by on-site factors
Red-breasted merganser wintering population	No significant decrease in population against national trends, caused by on-site factors
Oystercatcher wintering population	No significant decrease in population against national trends, caused by on-site factors
Lapwing wintering population	No significant decrease in population against national trends, caused by on-site factors
Knot wintering population	No significant decrease in population against national trends, caused by on-site factors
Dunlin wintering population	No significant decrease in population against national trends, caused by on-site factors
Curlew wintering population	No significant decrease in population against national trends, caused by on-site factors
Redshank wintering population	No significant decrease in population against national trends, caused by on-site factors
Waterfowl assemblage wintering population	No significant decrease in Waterfowl Assemblage population against national trends, caused by on-site factors

Table A2.1 Lough Foyle SPA Feature Objectives	
Waterfowl assemblage wintering population	Maintain species diversity contributing to the Waterfowl Assemblage
Habitat extent	Maintain or enhance the area of natural and semi-natural habitats potentially usable by Feature bird species. (2056.13 ha intertidal area) subject to natural processes
Habitat extent	Maintain the extent of main habitat components subject to natural processes
Roost sites wintering population	Maintain or enhance sites utilised as roosts

Table A2.2 Lough Neagh & Lough Beg SPA Feature Objectives

Table A2.2 Lough Neagh & Lough Beg SPA Feature Objectives	
Feature	**Component Objective**
Common tern breeding population	No significant decrease in population against national trends, caused by on-site factors
Common tern breeding population	Fledging success
Great crested grebe breeding population	No significant decrease in population against national trends, caused by on-site factors
Great crested grebe breeding population	Fledging success
Great crested grebe passage population	No significant decrease in population against national trends, caused by on-site factors
Whooper swan wintering population	No significant decrease in population against national trends, caused by on-site factors
Bewick's swan wintering population	No significant decrease in population against national trends, caused by on-site factors
Golden plover wintering population	No significant decrease in population against national trends, caused by on-site factors
Great crested grebe wintering population	No significant decrease in population against national trends, caused by on-site factors
Pochard wintering population	No significant decrease in population against national trends, caused by on-site factors
Tufted duck wintering population	No significant decrease in population against national trends, caused by on-site factors
Scaup wintering population	No significant decrease in population against national trends, caused by on-site factors
Goldeneye wintering population	No significant decrease in population against national trends, caused by on-site factors
Little grebe wintering population	No significant decrease in population against national trends, caused by on-site factors
Cormorant wintering population	No significant decrease in population against national trends, caused by on-site factors
Greylag goose wintering population	No significant decrease in population against national trends, caused by on-site factors

Table A2.2 Lough Neagh & Lough Beg SPA Feature Objectives	
Feature	**Component Objective**
Shelduck wintering population	No significant decrease in population against national trends, caused by on-site factors
Wigeon wintering population	No significant decrease in population against national trends, caused by on-site factors
Gadwall wintering population	No significant decrease in population against national trends, caused by on-site factors
Teal wintering population	No significant decrease in population against national trends, caused by on-site factors
Mallard wintering population	No significant decrease in population against national trends, caused by on-site factors
Shoveler wintering population	No significant decrease in population against national trends, caused by on-site factors
Coot wintering population	No significant decrease in population against national trends, caused by on-site factors
Lapwing wintering population	No significant decrease in population against national trends, caused by on-site factors
Waterfowl assemblage wintering population	No significant decrease in population against national trends, caused by on-site factors
Waterfowl assemblage wintering population	Maintain species diversity contributing to the Waterfowl Assemblage
Habitat	To maintain or enhance the area of natural and semi-natural habitats potentially usable by Feature bird species subject to natural processes
Habitat	Maintain the extent of main habitat components subject to natural processes
Habitat	Maintain or enhance sites utilised as roosts

Appendix 3: Natura 2000 Standard Data Forms

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NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE	*1.2. SITE CODE*	*1.3. COMPILATION DATE*	*1.4. UPDATE*
A	IE0004087	200404	

1.5. RELATION WITH OTHER NATURA 2000 SITES:

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland

1.7. SITE NAME:

Lough Foyle SPA

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI:	*DATE CONFIRMED AS SCI:*

DATE SITE CLASSIFIED AS SPA:	*DATE SITE DESIGNATED AS SAC:*
199610	

2. SITE LOCATION

2.1. SITE CENTRE LOCATION

LONGITUDE	LATITUDE
W 7 14 0	55 5 0

W/E (Greenwich)

2.2. AREA (HA):

346.81

2.3. SITE LENGTH (KM):

2.4. ALTITUDE (M):

MINIMUM	MAXIMUM	MEAN
-2	0	-1

2.5. ADMINISTRATIVE REGION:

NUTS CODE	REGION NAME	% COVER
IE011	Border	0
Marine area not covered by a NUTS-region		10

2.6. BIOGEOGRAPHIC REGION:

Alpine	Atlantic	Boreal	Continental	Macaronesian	Mediterranean
☐	☑	☐	☐	☐	☐

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	GLOBAL ASSESSMENT

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION			SITE ASSESSMENT		
		Resident	Migratory		Population	Conservation	Isolation
		Breed	Winter	Stage			
A005	Podiceps cristatus		21 i		**C**	**C**	**C**
A017	Phalacrocorax carbo		38 i		**C**	**C**	**C**
A046	Branta bernicla		79 i		**C**	**C**	**C**
A048	Tadorna tadorna		17 i		**C**	**C**	**C**
A050	Anas penelope		115 i		**C**	**C**	**C**
A053	Anas platyrhynchos		91 i		**C**	**C**	**C**
A069	Mergus serrator		11 i		**C**	**C**	**C**
A130	Haematopus ostralegus		275 i		**C**	**C**	**C**
A137	Charadrius hiaticula		28 i		**C**	**C**	**C**
A143	Calidris canutus		47 i		**C**	**C**	**C**
A160	Numenius arquata		390 i		**C**	**C**	**C**
A162	Tringa totanus		31 i		**C**	**C**	**C**
A164	Tringa nebularia		9 i		**C**	**C**	**C**
A169	Arenaria interpres		29 i		**C**	**C**	**C**
A179	Larus ridibundus		174 i		**C**	**C**	**C**
A182	Larus canus		130 i		**C**	**C**	**C**

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

GROUP	SCIENTIFIC NAME	POPULATION	MOTIVATION
B M A R F I P			
B	Larus argentatus	535 i	**D**
B	Larus marinus	109 i	**D**

(B = Birds, M = Mammals, A = Amphibians, R = Reptiles, F = Fish, I = Invertebrates, P = Plants)

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

Habitat classes	% cover
Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	98
Shingle, Sea cliffs, Islets	2
Total habitat cover	**100 %**

Other site characteristics

The site comprises a section of the western shore of Lough Foyle between Muff and White Castle. Habitat is almost entirely intertidal mudflat, with small areas of sand and shingle. The quality of intertidal habitat is not known but it may be somewhat enriched due to the proximity of Derry City (less than 10 km upstream).

4.2. QUALITY AND IMPORTANCE:

This site is a relatively small part of the Lough Foyle estuarine complex, a site of high ornithological importance. The Lough Foyle SPA provides feeding habitat for a range of wintering waterfowl species but all are in relatively low numbers. Gulls are regular in winter, with substantial numbers of Larus argentatus and Larus marinus.

4.3. VULNERABILITY

Despite the proximity of the site to Derry City, there are no known threats to the wintering bird populations. Any developments on the shore above the site could have adverse impacts on the bird populations.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State: Department of Communications, Marine and Natural Resources.

4.6. DOCUMENTATION

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I. (eds). Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Irish Wetland Birds Survey (I-WeBS) Database, 1994/95-2000/01. BirdWatch Ireland, Dublin.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

IMPACTS AND ACTIVITIES AROUND the site

CODE	INTENSITY	INFLUENCE
400	**A** B C	+ 0 -

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site will be prepared.

7. MAPS OF THE SITE

- Physical map

- Aerial photograph(s) included:

8. SLIDES

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type J **1.2 Site code** UK9020031

1.3 Compilation date 199901 **1.4 Update**

1.5 Relationship with other Natura 2000 sites

U	K	0	0	1	6	6	1	3

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Lough Foyle**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	199901
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	**latitude**
07 01 37 W	55 05 24 N

2.2 Site area (ha) 2204.36 **2.3 Site length (km)**

2.5 Administrative region

NUTS code	Region name	% cover
UKB	Northern Ireland	100.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A046b	*Branta bernicla hrota*			3730 I		A		C	
A038	*Cygnus cygnus*			890 I		B		C	
A157	*Limosa lapponica*			1896 I		B		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	96.4
Salt marshes. Salt pastures. Salt steppes	3.6
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	
Bogs. Marshes. Water fringed vegetation. Fens	
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Mud, Sand

Geomorphology & landscape:

Estuary, Intertidal sediments (including sandflat/mudflat), Lagoon

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Cygnus cygnus (Iceland/UK/Ireland)	8.6% of the all-Ireland population 5 year peak mean 1991/92-1995/96
Limosa lapponica (Western Palearctic - wintering)	11.9% of the all-Ireland population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Branta bernicla hrota (Canada/Ireland)	18.7% of the population in Ireland 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

Over winter the area regularly supports:

36599 waterfowl (5 year peak mean 01/10/1998)

Including:

Cygnus cygnus , Branta bernicla hrota , Limosa lapponica .

4.3 Vulnerability

Although a control programme has begun, the colonisation and spread of agressive non-native species such as *Spartina* spp. is a current pronlem and poses a potential threat in the future.
An exisiting Conservation Plan for Lough Foyle is now under review. This review will update exisiting management prescriptions and refine existing conservation objectives.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	20.0
UK04 (SSSI/ASSI)	100.0

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type F

1.2 Site code UK9020091

1.3 Compilation date 199604

1.4 Update 199902

1.5 Relationship with other Natura 2000 sites

U	K	0	0	3	0	2	4	4

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Lough Neagh and Lough Beg**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	199604
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	**latitude**
06 24 34 W	54 34 11 N

2.2 Site area (ha) 40835.53

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UKB	Northern Ireland	100.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A059	*Aythya ferina*			26341 I		A		C	
A061	*Aythya fuligula*			22372 I		A		C	
A067	*Bucephala clangula*			10776 I		A		C	
A037	*Cygnus columbianus bewickii*			136 I		B		B	
A038	*Cygnus cygnus*			1031 I		B		C	
A193	*Sterna hirundo*		185 P			B		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	95.0
Bogs. Marshes. Water fringed vegetation. Fens	2.2
Heath. Scrub. Maquis and garrigue. Phygrana	2.4
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	0.4
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Basalt, Clay, Igneous, Peat, Sand

Geomorphology & landscape:

Floodplain, Island, Lowland

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

Sterna hirundo	6% of the all-Ireland breeding population
(Northern/Eastern Europe - breeding)	Count, as at 1995

Over winter the area regularly supports:

Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe)	5.4% of the all-Ireland population 5 year peak mean 1991/92-1995/96
Cygnus cygnus (Iceland/UK/Ireland)	10% of the all-Ireland population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Aythya ferina (North-western/North-eastern Europe)	7.5% of the population 5 year peak mean 1991/92-1995/96
Aythya fuligula (North-western Europe)	2.2% of the population 5 year peak mean 1991/92-1995/96
Bucephala clangula (North-western/Central Europe)	3.6% of the population 5 year peak mean 1991/92-1995/96

ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS

Over winter the area regularly supports:

99262 waterfowl (5 year peak mean 01/04/1998)

Including:

Cygnus columbianus bewickii , Cygnus cygnus , Aythya ferina , Aythya fuligula , Bucephala clangula .

4.3 Vulnerability

The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments.
Historically, increased eutrophication may have enhanced wildfowl populations but the effect of eutrophication on such populations is little understood although it may have had a positive impact on wintering diving duck.
Although some spcies e.g. swans, use improved fields, recent changes in agricultural land-use i.e. agricultural intensification (land improvements/high grazing levels) and, in some cases, insufficient grazing and tree/scrub management resulting in vegetation succession, may adversely affect feeding/roosting areas for overwintering and breeding waterfowl.
Introduction of/invasion by non-native species such as Roach and potentially Zebra Mussels could have a deleterious effect on some species e.g. diving duck, but may be beneficial to others e.g. Great-crested Grebe.
Sand dredging is widespread throughout the Lough but the impact is largely unknown.
An existing Conservation Plan for Lough Neagh and Lough Beg is currently under review. This review will up-date existing management prescriptions and refine existing conservation objectives.
A total of 15 management agreements (NNR/ASSI) mainly for agricultural issues, are established on the site.
Phosphate stripping at appropriate STW has begun to address the issue of eutrophication. Other measures such agric-improvement schemes and Water Quality Management Plans to further address this issue are being considered.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	3.0
UK04 (SSSI/ASSI)	100.0

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE	*1.2. SITE CODE*	*1.3. COMPILATION DATE*	*1.4. UPDATE*
J	IE0004075	200406	

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0002287

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland.

1.7. SITE NAME:

Lough Swilly SPA

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI:	*DATE CONFIRMED AS SCI:*

DATE SITE CLASSIFIED AS SPA:	*DATE SITE DESIGNATED AS SAC:*
199511	

2. SITE LOCATION

2.1. SITE CENTRE LOCATION

LONGITUDE	LATITUDE
W 7 34 0	55 1 0

W/E (Greenwich)

2.2. AREA (HA):

3734.44

2.3. SITE LENGTH (KM):

2.4. ALTITUDE (M):

MINIMUM	MAXIMUM	MEAN
-5	5	-1

2.5. ADMINISTRATIVE REGION:

NUTS CODE	REGION NAME	% COVER
IE011	Border	20
Marine area not covered by a NUTS-region		8

2.6. BIOGEOGRAPHIC REGION:

Alpine	Atlantic	Boreal	Continental	Macaronesian	Mediterranean
☐	☑	☐	☐	☐	☐

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	GLOBAL ASSESSMENT

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION			SITE ASSESSMENT			
		Resident	Migratory		Population	Conservation	Isolation	
			Breed	Winter Stage				
A038	Cygnus cygnus			283 i	**B**	**A**	**C**	**A**
A140	Pluvialis apricaria			627 i	**C**	**B**	**C**	
A157	Limosa lapponica			110 i	**C**	**B**	**C**	
A395	Anser albifrons flavirostris			824 i	**B**	**A**	**C**	**A**

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION			SITE ASSESSMENT			
		Resident	Migratory		Population	Conservation	Isolation	
			Breed	Winter Stage				
A005	Podiceps cristatus			158 i	**B**	**A**	**C**	
A017	Phalacrocorax carbo			74 i	**C**	**B**	**C**	
A043	Anser anser			1208 i	**A**	**A**	**C**	**A**
A046	Branta bernicla			125 i	**C**	**B**	**C**	
A048	Tadorna tadorna			679 i	**B**	**A**	**C**	**A**
A050	Anas penelope			1166 i	**C**	**A**	**C**	
A052	Anas crecca			1485 i	**B**	**A**	**C**	**A**
A053	Anas platyrhynchos			751 i	**C**	**A**	**C**	
A056	Anas clypeata			56 i	**C**	**A**	**C**	
A061	Aythya fuligula			48 i	**C**	**B**	**C**	
A062	Aythya marila			111 i	**C**	**A**	**C**	
A067	Bucephala clangula			71 i	**C**	**A**	**C**	
A069	Mergus serrator			92 i	**B**	**A**	**C**	
A130	Haematopus ostralegus			1263 i	**C**	**A**	**C**	
A137	Charadrius hiaticula			39 i	**C**	**B**	**C**	
A142	Vanellus vanellus			1196 i	**C**	**A**	**C**	
A143	Calidris canutus			303 i	**C**	**A**	**C**	
A149	Calidris alpina			7001 i	**B**	**A**	**C**	**A**
A156	Limosa limosa			56 i	**C**	**B**	**C**	
A160	Numenius arquata			1508 i	**B**	**A**	**C**	
A162	Tringa totanus			1328 i	**B**	**A**	**C**	**A**
A164	Tringa nebularia			39 i	**C**	**A**	**C**	
A169	Arenaria interpres			48 i	**C**	**B**	**C**	
A179	Larus ridibundus			705 i	**C**	**B**	**C**	
A182	Larus canus			388 i	**C**	**B**	**C**	

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

GROUP							SCIENTIFIC NAME	POPULATION		MOTIVATION				
B	M	A	R	F	I	P								
B							Ardea cinerea	37	i			**C**		
B							Larus argentatus	71	i				**D**	
B							Cygnus olor	40	i			**C**		
B							Tachybaptus ruficollis	21	i			**C**		
	M						Lepus timidus hibernicus		p	**A**				
	M						Lepus timidus hibernicus		p		**B**			
	M						Lepus timidus hibernicus		p			**C**		

(B = Birds, M = Mammals, A = Amphibians, R = Reptiles, F = Fish, I = Invertebrates, P = Plants)

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

Habitat classes	% cover
Extensive cereal cultures (including Rotation cultures with regular fallowing)	10
Improved grassland	10
Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	78
Salt marshes, Salt pastures, Salt steppes	1
Shingle, Sea cliffs, Islets	1
Total habitat cover	**100 %**

Other site characteristics

Lough Swilly is a long sea inlet situated on the north Donegal coast. The site includes all of the inner part of the lough, extending from below Letterkenny to Ballygreen Point, and also includes the estuary of the Leannan River as far as the town of Rathmelton. This part of the site is estuarine in character, with shallow water and intertidal sand and mud flats being the dominant habitats. Salt marshes fringe much of the shoreline. Also included are the extensive polders at Blanket Nook and Big Isle. A lagoon occurs at Blanket Nook.

4.2. QUALITY AND IMPORTANCE:

Lough Swilly is a fine example of a large, natural sea inlet which is estuarine in character. The site supports an excellent diversity of wintering waterfowl for which it is the most important site in the north-west. It is of international importance because total numbers easily exceed 20,000 birds but it also has internationally important populations of Cygnus cygnus, Anser anser and Anser albifrons flavirostris. The Anser anser population represents over 30% of the national total, whilst the flock of Anser albifrons flavirostris is the largest in the country outside of the Wexford Slobs. In addition, there are at least 13 species which occur in numbers of national importance. Of particular note are the populations of Tadorna tadorna (4.6% of national total), Calidris alpina (7% of total) and Tringa totanus (4% of total). The site also supports regionally important numbers of Pluvialis apricaria and Limosa lapponica. Many of the birds regularly commute to Inch Lough and Levels, a separate SPA. The wintering birds of Lough Swilly have been well-monitored since the early 1980s.

4.3. VULNERABILITY

The maintenance of the high numbers of geese and swans is dependent on the continuation of favourable landuse practices on the polders. The principal commercial activity within the estuarine part of the site is aquaculture. It is not known if this is causing significant disturbance to the estuarine habitats or the bird populations. Despite the proximity of several towns, water quality is generally satisfactory. Recreational activities occur in several areas of site and could cause some disturbance to the birds if not properly controlled.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State: Department of Communications, Marine and Natural Resources

Private: multiple

4.6. DOCUMENTATION

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Curtis, T.G.F. and Sheehy Skeffington, M.J. (1998). The salt marshes of Ireland: an inventory and account of their geographical variation. Biology and Environment, Proceedings of the Royal Irish Academy 98B: 87-104.

Fox, A.D., Norriss, D.W., Stroud, D.A. and Wilson, H.J. (1994) Greenland White-fronted Geese in Ireland and Britain 1982/83 - 1993/94. Greenland White-fronted Goose Study research report no. 8. Greenland White-fronted Goose Study, Wales and National Parks and Wildlife Service, Dublin.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I. (eds.). Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Irish Wetland Birds Survey (I-WeBS) Database, 1994/95-2000/01. BirdWatch Ireland, Dublin.

McElwaine, J.G., Wells, J.H. and Bowler, J.M. (1995). Winter movements of Whooper Swans visiting Ireland: preliminary results. Irish Birds 5: 265-278.

McGarrigle, M.L., Bowman, J.J., Clabby, K.J., Lucey, J., Cunningham, P., MacCarthaigh, M., Keegan, M., Cantrell, B., Lehane, M., Clenaghan, C. and Toner P.F. (2002). Water Quality in Ireland 1998-2000. Environmental Protection Agency, Wexford.

Merne, O.J. (1989). Important bird areas in the Republic of Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds). Important Bird Areas in Europe. ICBP Technical Publication No. 9. Cambridge.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Sheppard, R. (2002). The wintering waterbirds of Lough Swilly, County Donegal. Irish Birds 7: 65-78.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

CODE	% COVER
IE05	1

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

TYPE CODE	SITE NAME	OVERLAP TYPE	% COVER
IE05	Blanket Nook Wildfowl Sanctuary	+	1

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

CORINE SITE CODE	OVERLAP TYPE	% COVER
800000124		

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

CODE	INTENSITY	% OF SITE	INFLUENCE
120	**A** B C	20	+ **0** -
140	**A** B C	10	+ **0** -
100	**A** B C	10	+ **0** -
200	**A** B C	10	+ **0** -
701	A B **C**	80	+ 0 **-**
621	A **B** C	20	+ **0** -

IMPACTS AND ACTIVITIES AROUND the site

CODE	INTENSITY	INFLUENCE
120	**A** B C	+ 0 **-**
400	**A** B C	+ **0** -

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

National Parks and Wildlife Service is responsible for managing part of the site as a Wildfowl Sanctuary

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site is in preparation.

7. MAPS OF THE SITE

- Physical map

- Aerial photograph(s) included:

8. SLIDES

Appendix 4: Integrity of Site Checklists

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Table A4.1 Integrity of Site Checklist for Lough Foyle SPA

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Table A4.2 Integrity of Site Checklist for Lough Swilly SPA

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Table A4.3 Integrity of Site Checklist for Lough Neagh & Lough Beg SPA

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Appendix 5: Statutory Consultee Agreement Communication

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Northern Ireland Environment Agency
www.daera-ni.gov.uk

Natural Environment Division
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast
BT7 2JA

Telephone: 028 9056 9812

Mr Seamus Keenan
DFI Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

Our Ref: DC/LJ A5

17 October 2017

Dear Mr Keenan,

Re: A5WTC Appropriate Assessment

NIEA CDP has considered the consultation on the Habitats Regulations Assessments (HRAs) relating to the proposed A5 Western Transport Corridor received on 24 August 2017 and discussed at a meeting held on 6 September 2017 and makes the following comments.

NIEA CDP previously queried drainage from the scheme, both during construction and operation, which will ultimately be to the River Foyle and Tributaries SAC/ASSI. The HRA documents reference a measure of 50 mg/l for total suspended solids to be placed on any discharge consent and that the Water Framework Directive measures will be incorporated. It is advised that the rationale and appropriateness of this value are explicitly included in the document given the status of the receiving water body as an SAC in part of spawning Atlantic salmon. The highest possible level of protection should be afforded to the SAC rivers and justification provided that no unnaturally high levels of suspended solids will be introduced.

The documents include proposed use of rip-rap constructed from gabion mattresses. Concerns previously raised surrounded the use in high energy rivers where there is a risk that structures can become damaged leading to loss of contents to the extent they can form fish traps leading to adverse effects on fish species including Atlantic salmon. Consideration of this has not been made. It is advisable that alternatives to gabion baskets should be investigated. Further to this, clarification should be provided regarding clear span bridges – if these are clear span then protective measures such as gabion baskets should not be required.

The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205 metres. Air quality modelling has been undertaken using ADMS Roads. All works associated with the appropriate section will be carried out within 500 metres of the SAC. The initial modelling indicated that nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was indicated as being an error in modelling and an explanation has been

provided. The rationale within this document should clearly explain the parameters which have affected the results given its public availability.

The current modelling indicates that deposition would be between 0.2 and 0.4% of the critical load for the site. In line with current policies NIEA CDP considers the modelled values to be insignificant.

If you require any further information please contact Lee Jones on the above number.

Yours sincerely,

Keith Finegan
Authorised Officer

Cc: Manny Gault - Client Project Manager - A5 WTC – (email)

Subject: FW: 2017-06-05_SI to DAHG_HRA Consultation

From: Manager Dau [mailto:Manager.Dau@chg.gov.ie]
Sent: 02 October 2017 12:02
To: Ireland, Stuart <Stuart.Ireland@wsp.com>
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Hi Stuart,

The Department has no further nature conservation comments in relation to the updated documents.

Kind regards,

Yvonne

Yvonne Nolan
Development Applications Unit
Department of Culture, Heritage, and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

(053) 9117382

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

From: Ireland, Stuart [mailto:Stuart.Ireland@wsp.com]
Sent: 02 October 2017 10:13
To: Manager Dau
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Dear Yvonne,

As you may be aware, the 3rd consultation on the A5 Western Transport Corridor, Habitats Regulations Assessments, closes today.

Could you please let me know if NPWS has any comments to make in realtion to the updated documents?

Kind regards,

Stuart

Stuart Ireland ***BSc (Hons) CEnv MCIEEM***
Associate

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Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

DfI Roads Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

08 November 2017

Dear Sir/Madam

RE: 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment.

Thank you for your recent correspondence in relation to the above-mentioned proposed development. The Loughs Agency is the statutory body charged with the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

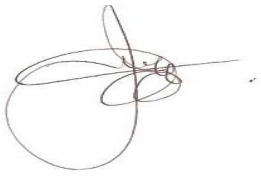
The Loughs Agency has considered the information provided in the 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment and would have no further comments at this stage.

Yours sincerely

22 Victoria Road, Prehen, Londonderry, BT47 2AB
Tel: 028 71 342100 Fax: 028 71 342720 Txt Phone: 028 71 318000
www.loughs-agency.org

Loughs Agency

Gníomhaireacht na Lochanna
Factrie fur Loughs



John McCartney
Director of Conservation & Protection

22 Victoria Road, Prehen, Londonderry, BT47 2AB
Tel: 028 71 342100 Fax: 028 71 342720 Txt Phone: 028 71 318000
www.loughs-agency.org

Habitats Regulations Assessment

718736-3000-R-019 Ramsar Sites

(RAMSAR SITE ASSESSMENT)

A5 Western Transport Corridor

November 2017

Produced for

Department for Infrastructure

Prepared by

Project Office:
WSP
Shorefield House
30 Kinnegar Drive
Holywood
County Down
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Document Control Sheet

Project Title	A5 Western Transport Corridor
Report Title	Habitats Regulations Assessment Ramsar Sites.
Document Ref	718736-3000-R-019
Revision	4
Status	Final
Control Date	6th November 2017

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
1	Consultation Draft	S. Ireland	10/04/14	P. Reid	16/04/14	P. Reid	16/04/14
2	Consultation Draft	S. Ireland	23/03/07	J. O'Neill	25/03/17	P. Edwards	31/03/17
3	Consultation Draft	S. Ireland A.Bascombe	11/08/17	B. Walker	19/08/17	P. Edwards	20/08/17
4	Final	S. Ireland	03/11/17	B. Walker	13.11.17	P. Edwards	17.11.17

Distribution

Organisation	Contact	Copies
Department for Infrastructure	Seamus Keenan	1
NIEA	David Chambers	1
Development Applications Unit National Parks and Wildlife Service	Yvonne Nolan	1
Loughs Agency	Declan Lawlor	1
RSPB	Michelle Hill	1
Publication		Deposit Locations

Schedule of Changes

The following table outlines the updates made to the Report of Information to Inform Appropriate Assessment: Ramsar Sites, on receipt of comments received in response to the 3rd consultation concluding in October 2017.

Section Edited	Update
Document Control Sheet	Revision, Status, Record of Issue details
1.1.1	Minor text amendments for clarity
1.1.6	Minor text amendments for clarity
1.1.9	Paragraph removed as no longer relevant
1.2.1	Text deleted to avoid repetition
1.2.2	Additional text added to clarify links to national primary road network in the Republic of Ireland, other minor text amendment for clarity
1.2.3	Minor text amendments for clarity
1.3.6	Minor text amendments for clarity and qualifications of reviewers added
2.2.2	Guidance text refined
Tables 3.1 – 3.2	Minor text amendments for clarity and cross reference to Statutory Consultee agreement communications added
4.2.5	Minor text amendments for clarity
4.2.9	Minor text amendments for clarity
4.2.12	Additional text added on assessment focus
4.2.14 – 4.2.16	Climate change text added
4.2.15 and References	Source of Figures added
4.2.17	Additional sub-heading added
4.2.19	Minor text amendments for clarity
4.2.22	Water Management Unit added to bullets; footnote added, typo in footnote corrected; all subsequent footnote numbering amended accordingly; discharge rate text amended for technical accuracy; operational design parameters amended
4.2.23	Text added
4.2.24	Standard suspended sediment value corrected to Northern Ireland value
4.2.25	Standard suspended sediment value corrected to Northern Ireland value.
5.1.2	Typos corrected
5.3.2	Typos corrected and minor text amendments for clarity

Section Edited	Update
5.3.4	Additional culvert amendments made
5.4.1	Typos corrected
5.5.1	Minor text amendments for clarity
5.5.2	Cross reference updated
5.5.3	Typos corrected and minor text amendments for clarity
5.5.5 – 5.5.6	New sub-heading added, additional text on design mitigation added
5.5.7	Minor text amendments for clarity
5.5.8	Website URL moved to footnote
5.5.9	Minor text amendments for clarity
7.1.1	Minor text amendments for clarity
7.1.3	Minor text amendments for clarity
7.2.1	Minor text amendments for clarity
7.2.12	Minor text amendments for clarity
7.2.16	Minor text amendments for clarity
Footnote 18	Minor text amendments for clarity
7.2.20	Minor text amendments for clarity
7.2.21	Text added
7.2.23	Minor text amendments for clarity
7.2.24	Minor text amendments for clarity
7.2.25	Title amended for clarity
7.2.28	Minor text amendments for clarity
7.2.30	Minor text amendments for clarity
7.2.35	Minor text amendments for clarity
7.3.7	Minor text amendments for clarity
7.3.9	Additional text added for clarification
7.3.12	Additional text on gabion selection and maintenance added. Footnote 22 added.
7.3.22	Typos corrected
7.3.27	Typos corrected
7.4	In-Combination effects added
7.5	Adaptive Monitoring added

Section Edited	Update
8.1.1	Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 – typo corrected and ROI regulation update
8.1.2	Guidance text updated
8.1.3	Paragraph deleted, no longer relevant
8.1.4	Conclusion finalised
References	Updated in line with text amendments
Appendix 2	Updated following discussions with consultees
Appendix 3	Updated following discussions with consultees
Appendix 4	Updated following discussions with consultees
Appendix 5	Minor Revisions following Consultation
Appendix 6	Minor Revisions following Consultation
Appendix 9	Outfalls outside the Foyle catchment removed for clarity
Appendix 10	New appendix providing Statutory Consultee agreement communications

Contents

Appendices

Tables

1 Introduction

1.1.1 This document is a Ramsar Site Assessment which examines the potential effects of the A5WTC scheme on the Ramsar International Wetland Sites in the vicinity of the Scheme. The report is one of four reports covering the assessment of impacts on the nationally and internationally designated sites along the A5 Western Transport Corridor (A5WTC) Proposed Scheme and as a number of these sites carry dual designations, the data sourced, assessments carried out and conclusions reached are the same. This report, therefore, duplicates relevant sections of the Reports to Inform an Appropriate Assessment for Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) (see para 1.1.6 below) and the same format and report naming structure has been applied for consistency with a programme for delivery which mirrors that for the Habitats Regulations Assessment (HRA) process.

1.1.2 It is intended that this information be submitted to the relevant government authorities, in order to inform reporting on UK responsibilities under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (**Ramsar Convention or Wetlands Convention**).

1.1.3 The Convention has three main 'pillars' of activity: the designation of wetlands of international importance as Ramsar sites; the promotion of the wise-use of all wetlands in the territory of each country; and international co-operation with other countries.

1.1.4 The UK has generally chosen to underpin the designation of its Ramsar sites through prior notification of these areas as Areas of Special Scientific Interest (ASSIs) in Northern Ireland). Accordingly, these receive statutory protection under the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (as amended).

1.1.5 The Government have issued policy statements relating to the special status of Ramsar sites[1]. This extends the same protection at a policy level to listed Ramsar sites in respect of new development as that afforded to sites which have been designated under the EC Birds and Habitats Directives as part of the EU Natura 2000 network.

1.1.6 Following consultation with Northern Ireland Environment Agency (NIEA) and National Parks & Wildlife Service (NPWS) in the Republic of Ireland ten sites were identified as ones which should be considered in accordance with the requirements of the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Regulations:

- River Foyle and Tributaries SAC

[1] Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites

- River Finn (Republic of Ireland) SAC
- Owenkillew River SAC
- Tully Bog SAC
- Lough Swilly (including former Inch Lough and Levels) SPA
- Lough Foyle SPA (Northern Ireland)
- Lough Foyle SPA (Republic of Ireland)
- Lough Neagh and Lough Beg SPA
- Lough Foyle Ramsar Site
- Lough Neagh & lough Beg Ramsar Site

1.1.7 Three Reports have been produced under the Habitats Regulations, which will inform the Appropriate Assessment required for the Scheme, namely:

- HRA Report - Tully Bog SAC
- HRA Report - SPAs (for Lough Swilly SPA; Lough Foyle SPA; and Lough Neagh and Lough Beg SPA; and
- HRA Report – SAC Watercourses (for River Foyle & Tributaries SAC; River Finn SAC and Owenkillew SAC).

1.1.8 This Report specifically addresses the Lough Foyle Ramsar site and Lough Neagh & Lough Beg Ramsar site with regard to its conservation status and objectives, and is intrinsically linked to the outcomes of the HRA Report – SPAs, and HRA report – SAC Watercourses.

1.1.9 The Northern Ireland Environment Agency (NIEA) as part of the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland (NI), the Loughs Agency, (as a statutory consultee for both NI and the Republic of Ireland), the National Parks and Wildlife Service (NPWS) (as a statutory consultee for the Republic of Ireland) as well as Inland Fisheries and the Royal Society for the Protection of Birds (RSPB), were consulted throughout the development stages of this report. Comments received from these bodies, as well as information and relevant comments received from public consultation, have been addressed and incorporated in this final report, which will be considered by Department for Infrastructure (DfI) as the Competent Authority when undertaking the Appropriate Assessment required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and the Regulations.

1.2 Background

1.2.1 The A5WTC is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (DfI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.

1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal connects to the national primary road network in the Republic of Ireland at 2 locations, the N14/N15 roads at Strabane/Lifford into Co. Donegal and the N2 at Aughnacloy into Co. Monaghan. Donegal County Council are promoting a new road which connects the A5WTC to the N15 just south of Lifford and this connectivity has been developed in co-operation with the A5WTC project team. These proposals have been progressed through the statutory process and the decision to proceed will be confirmed so that construction and opening to traffic coincides with the opening of the A5WTC around Strabane. This scheme crosses the River Finn SAC and the proposals have been subject to HRA within the Republic and considered under the cumulative effects section of the relevant WSP reports (see 1.1.6 above). Proposals to upgrade the N2 are currently on hold and any impacts on the A5WTC at the border in Co. Monaghan cannot be assessed at this point in time, though this location nor the consequences of change at this location are considered as not affecting any of the Natura 2000 sites considered in these Reports.

1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown on Appendix 1 - Sheets 1 to 24:

- Phase 1a: Junctions 1-3 (New Buildings – north of Strabane) and Phase 1b: Junctions 13-15 (south of Omagh – A4,Ballygawley) between 2017 and 2019;
- Phase 2: Junctions 3-13 (north of Strabane – south of Omagh) between 2021 and 2023; and
- Phase 3: Junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.

1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft HRA which recognised and screened[2] the above European Designated SACs and

[2] In accordance with government policy, the Ramsar sites were subject to a similar assessment methodology as the SAC and SPA sites. In the first instance a screening exercise (Test of Likely Significance (ToLS) was

SPAs for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment[3].

1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.

1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been delayed to ensure they contain the most up to date information.

1.3 Preparation of the Report

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is

undertaken to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the HRA process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by NIEA, the statutory consultee relative to the designated sites in Northern Ireland and NPWS the organisation charged with the implementation of the Habitats and Birds Directives in the ROI.

[3] The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations.

familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.

1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road through a Site of Special Scientific Interest (SSSI) was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with clients, contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

1.3.4 Stuart has been assisted by Andy Bascombe, BSC (Hons), MSc, PhD, CEnv, CSci. Andy is a Technical Director at WSP with specific responsibility for ecology, with over 25 years of experience in environmental consultancy. He holds a BSc in Biological Sciences from Leicester University, an MSc in Ecology from UCNW Bangor, and a PhD in Applied Ecology from Middlesex Polytechnic. He is a Chartered Scientist and a Chartered Environmentalist and a full member of both the Chartered Institute of Ecology and Environmental Management and the Chartered Institution of Water and Environmental Management.

1.3.5 Andy has worked on a wide range of projects in the UK and overseas for public and private sector clients, local planning authorities, government departments and other bodies, providing ecological and environmental advice at all stages of developments. He is an experienced project manager who has been responsible for environmental aspects of major developments, and has managed Environmental Statements and Environmental Impact Assessments (EIAs) produced for planning applications, undertaken specialist studies including numerous Habitats Regulations Assessments and Appropriate Assessments. He has given expert witness evidence at several Public Inquiries, and has a thorough appreciation of the requirements of all stages of development having worked on projects from conceptual design through to post-construction monitoring.

1.3.6 The assessment was also reviewed and added to by Mabbett Associates (Dr James O'Neill - BSc (Hons) Zoology PhD Ecology and Conservation, Dr Gen Cannibal - BSc Environmental Biology, MSc Environmental Assessment and Management, PhD Environmental Impact Assessment (2nd Consultation Draft) and Beverley Walker – BSc (Hons) Botany Grad Dip Env. Law (UK & EU), (2nd, 3rd Consultation Draft and final report)).

2 The Ramsar Site Assessment Process

2.1 Objectives

2.1.1 The Ramsar Convention has three main 'pillars' of activity: the designation of wetlands of international importance as Ramsar sites; the promotion of the wise-use of all wetlands in the territory of each country; and international co-operation with other countries.

2.1.2 The Ramsar sites applicable to this assessment have also been designated as sites protected under European legislation, particularly the Habitats and Birds Directives.

2.1.3 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.

2.1.4 The maintenance of habitats and species within Natura 2000 sites at favourable conservation status will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national and European level, and by default, at the International Level.

2.1.5 Favourable conservation status of a site is achieved when:

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

2.1.6 The favourable conservation status of a species is achieved when:

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

2.1.7 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has significantly influenced the Scheme design.

2.1.8 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.

2.1.9 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.

2.2 Approach to the Ramsar Site Assessment

2.2.1 The purpose of this Ramsar Site Assessment report is to mimic the Habitat Regulations/Appropriate Assessment process applied to European sites, by providing information on the likely significant effects of the Scheme on the features of the respective sites, identify the mitigation measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2.2 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000)', and European Commission (2001) 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09). EU Guidance on Climate Change and Biodiversity (2013) was reviewed.

2.2.3 In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of Likely Significance

2.2.1 This is where it is established if an appropriate assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment

2.2.2 Should Stage 1 determine that there is a 'likelihood' of an effect on the qualifying features of a site, or that any significant effects cannot be ruled out, then the assessment proceeds to Stage 2. This stage considers the potential impacts on the structure and function (**integrity**), as well as the **conservation objectives** of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage includes:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of the likely impacts on the conservation objectives of the site, and an assessment of their significance;
- Mitigation Measures; and
- Conclusions.

2.2.3 If it cannot be ruled out that no significant adverse effects will occur on a site's conservation objectives, then the assessment proceeds to Stages 3 and 4.

Stage 3: Assessment of alternative solutions

2.2.4 This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

2.2.5 This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.6 This HRA report addresses Stage 1 and Stage 2 of the HRA Process.

Note: For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified

3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the Design Manual for Roads & Bridges (DMRB) method of assessment, screening matrices have been completed for each of the potentially affected Natura 2000 sites. Tables 3.1 and 3.2 provide this information and are supported by reference to the A5WTC ES 2010 and the A5WTC ES 2016.

Table 3.1 Screening Matrix for Lough Foyle Ramsar Site

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site		
Project Name:	A5 WTC	
Site under Consideration:	Lough Foyle Ramsar Site	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
23/07/13	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. The existing A5 passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Ramsar Site by virtue of:		
Size and scale (road type and probable traffic volume)	The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the Ramsar Site, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (Average Annual Daily Traffic) (to the nearest 100) by 2040. There will be no direct impacts on the Ramsar Site. However, both construction and operation of the road could lead to impacts on key foraging areas outside of the Ramsar Site and on birds foraging within these areas.	
Land-take	There will be no land take within the Ramsar Site. Outside of the Ramsar Site, the land take will involve areas of functional habitat utilised by Whooper Swan,	

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
	Greylag Goose and by Atlantic salmon and sea lamprey. All four species are identified in the information sheet for the Ramsar Site.
Distance from the Ramsar Site or key features of the site (from edge of the project assessment corridor)	The proposed scheme is located approximately 10km south of the Ramsar Site. Birds which are known to use the Ramsar Site and which are designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. The proposed scheme will also involve the implementation of works and future presence of the proposed dual carriageway and its associated traffic along and in the vicinity of watercourses within the Foyle Catchment which are utilised by Atlantic salmon and Sea lamprey.
Resource requirements (from the Ramsar Site or from areas in proximity to the site, where of relevance to consideration of impacts)	None.
Emissions (e.g. polluted surface water runoff - both soluble and insoluble pollutants, atmospheric pollution)	The proposed scheme is located approximately 10km south of the Ramsar Site. Numbers of the populations of designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months. The proposed scheme will also involve the implementation of works and future presence of the proposed dual carriageway and its associated traffic along and in the vicinity of watercourses within the Foyle Catchment which are utilised by Atlantic salmon and Sea lamprey.
Excavation requirements (e.g. impacts of local hydrogeology)	The proposed works will not involve excavation in the designated area. There will be a requirement for excavation in relation to the proposed vertical alignment between Magheramason and the Burn Dennet and associated with works in the vicinity of the watercourses in the Foyle Catchment. None of the excavation has the potential to affect the designated sites by virtue of impacts on hydrogeological features which are essential to the designation or the functional

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
	habitat utilised by species identified in the Information Sheet for the sites.
Transportation requirements	Transportation requirements relative to the delivery and removal of materials and plant from the working areas required for the construction of the proposed scheme will not involve direct or indirect impacts on the designated sites.
Duration of construction, operation, etc	It is anticipated that construction relative to the parts of the proposed scheme where a relationship between the Ramsar Sites and their associated species has been identified will last for a period of 2-3 years beginning in 2017 and 2021.
Other	None.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. For Atlantic salmon: 1. Open span crossings of Mourne and Derg. 2. Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. 3. Appropriate pipe culverts on watercourse crossings with sea lamprey potential. 4. Treatment of water outfalling from the scheme to reduce pollutants and sediment. Without significant further investigation, certainty of the effectiveness of these measures for Atlantic salmon cannot be confirmed.
Location	Any mitigation relevant to the bird species of the Lough Foyle Ramsar Site is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations. For Atlantic salmon and sea lamprey: 1. Mourne and Derg crossings 2. Throughout the scheme.

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
	3. Throughout the scheme. 4. Throughout the scheme.
Evidence for effectiveness	At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out. For Atlantic salmon: 1. Open span crossings of Mourne and Derg. 2. Box culverts at minor watercourse crossings with salmonid spawning or nursery potential. 3. Appropriate pipe culverts on watercourse crossings with sea lamprey potential. 4. Treatment of water outfalling from the scheme to reduce pollutants and sediment. Without significant further investigation, certainty of the effectiveness of these measures for Atlantic salmon cannot be confirmed.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	TNI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by TNI will monitor the implementation of the measures throughout construction.
Characteristics of Ramsar Site(s) *A brief description of the Ramsar Site should be produced, including information on:*	
Name of Ramsar Site and its EU code	Lough Foyle Ramsar Site 3UK133
Location and distance of the Ramsar Site from the proposed works	The proposed scheme is located approximately 10km south of Lough Foyle Ramsar Site.
Ramsar Site size	2204.36 ha
Key features of the Ramsar Site including the primary reasons for selection and any other qualifying interests	<u>Ramsar criterion 1</u> This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches. This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
	functioning of a major river basin which is located in a trans-border position. Ramsar criterion 2 The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad *Alosa alosa*, twaite shad *A. fallax fallax*, smelt *Osmerus eperlanus* and sea lamprey *Petromyzon marinus*, all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon *Salmo salar* migrate through the system to and from their spawning grounds. Ramsar criterion 3 The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of Whooper swan *Cygnus cygnus*, light-bellied brent goose *Branta bernicla hrota* and bar-tailed godwit *Limosa lapponica*. Additional wildfowl species which are nationally important in an all-Ireland context are red-throated diver *Gavia stellata*, great crested grebe *Podiceps cristatus*, mute swan *Cygnus olor*, Bewick's Swan *C. columbianus*, Greylag goose *Anser anser*, shelduck *Tadorna tadorna*, teal *Anas crecca*, mallard *A. platyrhynchos*, wigeon *A. penelope*, eider *Somateria mollissima*, and red-breasted merganser *Mergus serrator*. Nationally important wader species are oystercatcher *Haematopus ostralegus*, golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, dunlin *C. aplina*, curlew *Numenius arquata*, redshank *Tringa totanus* and greenshank *T. nebilaria*. Ramsar criterion 5 The site *supports* about 29000 migratory birds. *Species* and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7. Ramsar criterion 6 *Qualifying* Species/populations (as identified at designation): Species with peak counts in spring/autumn: Whooper swan, *Cygnus cygnus*, Iceland/UK/Ireland Light-bellied brent goose, *Branta bernicla hrota*, East Canada/Ireland

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
	Species with peak counts in winter: Bar-tailed godwit, *Limosa lapponica lapponica*, W Palearctic Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm. See Sections 19/20 of the Ramsar Information Sheet in Appendix 7 for details of noteworthy species Details of bird species occurring at levels of National importance are given in Section 20 of the Ramsar Information Sheet in Appendix 7.
Vulnerability of the Ramsar Site – any information available from the standard data forms on potential effect pathways	Invasive species e.g. *Spartina spp.*
Ramsar Site conservation objectives – where these are readily available	NIEA state that no separate conservation objectives exist for Lough Foyle Ramsar Site. It is considered therefore that the conservation objectives of the Lough Foyle and Tributaries SPA and SAC will be applied.
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Ramsar Site.*	
<u>Potential Impacts on Whooper swan</u> The proposed scheme has the potential to give rise to effects on Whooper swan associated with functional habitat outside of the Ramsar Site this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. <u>Potential Impacts upon Greylag geese</u> The scheme has the potential to give rise to effects on Greylag geese associated with this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects. <u>Potential habitat degradation and indirect effects to Atlantic salmon and sea lamprey</u> The scheme could result in the loss, degradation and fragmentation of some habitat relevant to Atlantic salmon and sea lamprey. This could give rise to significant effects on the site. <u>Potential impacts upon Atlantic salmon and sea lamprey</u> The scheme could give rise to significant effects as a result of construction procedures, water quality deterioration or disturbance due to light, noise and vibration.	

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
Initial Assessment *The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	None.
Disturbance to key species	The scheme may cause a significant effect on Whooper swan, Greylag geese, Atlantic salmon and sea lamprey due to disturbance in areas of functional habitat outside of the Ramsar Site which are used by the species.
Habitat or species fragmentation	The scheme is unlikely to cause a significant effect to Whooper swan or Greylag geese due to fragmentation since all sites currently used by the designation species will remain available. In terms of Atlantic salmon and sea lamprey the scheme could have significant effects due to fragmentation of habitat where the proposed scheme crosses watercourses within the River Foyle Catchment.
Reduction in species density	The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the site by some or all of the designation species population that currently use it. The scheme could result in a reduction in Atlantic salmon and sea lamprey species density through pollution/sedimentation of habitat.
Changes in key indicators of conservation value (water quality, etc)	The scheme could result in changes in water quality a key indicator of conservation value to Atlantic salmon and sea lamprey
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. It is difficult to determine whether greenhouse gas emissions will be significantly altered by the proposed scheme, as a reduction in the stop-go nature of the congested current network reduces CO2 emissions, while an increase in average speed above 45mph increases CO2 emissions.
Describe any likely impacts on the Ramsar Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
Interference with key relationships that define the function of the site	Possible disturbance of Whooper swans and Greylag geese using functional habitat outside of the Ramsar site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds fitness and ability to survive and impacting on the function of the site as winter bird habitat. The scheme could result in a reduction in the density and distribution of Atlantic salmon and sea lamprey through habitat severance, loss and decrease in water quality.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No habitat loss within the Ramsar Site. Loss of approximately 40ha of potential foraging habitat west of the existing A5.
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	Unlikely to be a significant effect as all foraging habitat utilised by Whooper swan or Greylag geese will remain. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation.
Loss	The project will not cause direct loss of Whooper swan or Greylag geese. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of Whooper swan or Greylag geese. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation.
Disruption	No disruption of the Ramsar Site will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of Whooper swan and Greylag geese. This could have a significant effect on the Ramsar Site. There could be a significant effect on Atlantic salmon and sea lamprey subject to mitigation.
Change to key elements of the site (e.g. water quality, hydrological regime etc)	There could be a significant effect outside the Ramsar Site, subject to mitigation.

Table 3.1 DMRB Screening Matrix for Lough Foyle Ramsar Site	
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant effect possible on Whooper swan, Greylag geese, Atlantic salmon and sea lamprey.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES See Appendix 10

Table 3.2 Screening Matrix for Lough Neagh & Lough Beg Ramsar Site

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site		
Project Name:	A5WTC	
Site under Consideration:	Lough Neagh & Lough Beg Ramsar Site	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
23/07/13	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. The existing A5 passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2021 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Ramsar Site by virtue of:		
Size and scale *(road type and probable traffic volume)*	The project involves the construction of an 85 km long dual carriageway involving construction within the Foyle floodplain in an area known to support birds associated with the Ramsar Site, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 23300 AADT (to the nearest 100) by 2040. There will be no direct impacts on the Ramsar Site. However, both construction and operation of the road could lead to	

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
	impacts on key foraging areas outside of the Ramsar Site and on birds foraging within these areas.
Land-take	There will be no land take within the Ramsar Site. Outside of the Ramsar Site, the land take will involve areas of functional habitat utilised by Whooper Swan, Greylag Goose for feeding. Both species are identified in the information sheet for the Ramsar Site.
Distance from the Ramsar Site or key features of the site *(from edge of the project assessment corridor)*	The proposed scheme is located approximately 20km west/south-west of the Ramsar Site. Numbers of the populations of designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months.
Resource requirements (from the Ramsar Site or from areas in proximity to the site, where of relevance to consideration of impacts)	None.
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The proposed scheme is located approximately 20km west/south-west of the Ramsar Site. Birds which are known to use the Ramsar Site and which are designation feature species of the Ramsar Site (Whooper Swan and Greylag Geese) are, however, known to utilise parts of an area between Magheramason and the Burn Dennet defined to the west by the River Foyle and to the east by the existing A5 where the proposed scheme will follow a north-south alignment which reflects that of the existing road during the winter months.
Excavation requirements (e.g. impacts of local hydrogeology)	The proposed works will not involve excavation in the designated area. There will be a requirement for excavation in relation to the proposed vertical alignment between Magheramason and the Burn Dennet. None of the excavation has the potential to affect the designated sites or the functional habitat utilised by species identified in the Information Sheet for the sites.
Transportation requirements	Transportation requirements relative to the delivery and removal of materials and plant from the working areas required for the construction of the proposed scheme will not involve direct or indirect impacts on the designated sites.

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
Duration of construction, operation, etc	It is anticipated that construction relative to the parts of the proposed scheme along the Foyle floodplain, at watercourse crossings and in areas in close proximity to watercourses will last for a period of 2-3 years beginning in 2017 and 2021.
Other	None.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	At present the operational requirements of the construction are not finalised, therefore potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Location	Any mitigation relevant to the bird species of the Lough Neagh & Lough Beg Ramsar Site is likely to be restricted to the eastern Foyle floodplain in areas utilised by the relevant bird populations.
Evidence for effectiveness	Potential mitigation for bird species in terms of controlled working timeframe of April to September (inclusive) cannot be confirmed. Therefore the potential for disturbance impacts cannot be ruled out.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	DfI will place contractual obligations on contractors to provide all necessary mitigation. Environmental Representatives employed by DfI will monitor the proposed scheme throughout construction.
Characteristics of Ramsar Site(s) ***A brief description of the Ramsar Site should be produced, including information on:***	
Name of Ramsar Site and its site code	Lough Neagh and Lough Beg Ramsar Site (Site Code 3UK009)
Location and distance of the Ramsar Site from the proposed works	The proposed scheme is located approximately 20km to the west/south-west of the closest extent of the Ramsar site.
Ramsar Site size	50,165.84 ha
Key features of the Ramsar Site including the primary reasons for selection and any other qualifying interests	<u>Ramsar criterion 1</u> A particularly good representative example of natural or near-natural wetlands, common to more than one biogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
	species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore. Ramsar criterion 2 Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or animal or an appreciable number of individuals of any one of these species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort *Elatine hydropiper*, marsh pea *Lathyrus palustris*, Irish lady's tresses *Spiranthes romanzoffiana*, alder buckthorn *Frangula alnus*, narrow small-reed *Calamagrostis stricta* and holy grass *Hierochloe odorata*. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp *Mysis relicta*, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, *Stenus palposus* and *Dyschirius obscurus*, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly. Ramsar criterion 3 This site is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large number of plants and animal species are confined or almost confined to this area within Northern Ireland. Ramsar criterion 4 This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe *Podiceps cristatus*, gadwall *Anas strepera*, pochard *Aythya ferina*, tufted duck *A. fuligula*, snipe *Gallinago gallinago* and redshank *Tringa totanus*. Other important breeding wetland species include shelduck *Tadorna tadorna*, teal *Anas*

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
	crecca, shoveler *A. clypeata*, lapwing *Vanellus vanellus* and curlew *Numenius.arquata*. Ramsar criterion 5 Assemblages of international importance: Species with peak counts in winter: 86639 waterfowl (5 year peak mean 1998/99-2002/2003) Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7. Ramsar criterion 6 Qualifying Species/populations (as identified at designation): Species with peak counts in spring/autumn: Tundra swan, *Cygnus columbianus bewickii*, NW Europe Species with peak counts in winter: Common goldeneye, *Bucephala clangula clangula*, NW & C Europe Common pochard, *Aythya ferina*, NE & NW Europe Greater scaup, *Aythya marila marila*, W Europe Tufted duck, *Aythya fuligula*, NW Europe Whooper swan, *Cygnus cygnus*, Iceland/UK/Ireland Species/populations identified subsequent to designation for possible future consideration under criterion 6. Species with peak counts in spring/autumn: Great cormorant, *Phalacrocorax carbo carbo*, NW Europe Mute swan, *Cygnus olor*, Britain More contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm. Ramsar criterion 7 The site supports a population of pollan *Coregonus autumnalis*, one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
	species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco.
Vulnerability of the Ramsar Site – any information available from the standard data forms on potential effect pathways	Eutrophication: The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments. Pollution – fertilisers: The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments.
Ramsar Site conservation objectives – where these are readily available	NIEA state that no separate conservation objectives exist for Lough Neagh & Lough Beg Ramsar Site.
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Ramsar Site.*	
Potential Impacts on Whooper swan The proposed scheme has the potential to give rise to effects on Whooper swan associated with functional habitat outside of the Ramsar Site this site through disturbance and habitat loss outside of the designated site. Mitigation proposals for the construction phase cannot be confirmed at this point, therefore, there remains a potential for significant effects.	
Initial Assessment *The key characteristics of the site and the details of the Ramsar Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	None.
Disturbance to key species	The scheme may cause a significant effect on Whooper swan due to disturbance.
Habitat or species fragmentation	The scheme is unlikely to cause a significant effect to Whooper swan due to fragmentation since all sites currently used by the designation species will remain available

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
Reduction in species density	The scheme may cause a reduction in species density if the disturbance of foraging birds is sufficient to cause desertion of the site by some or all of the designation species population that currently use it.
Changes in key indicators of conservation value (water quality, etc)	The scheme is unlikely to result in changes in key indicators of conservation value as sufficient mitigation is in place.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. It is difficult to determine whether greenhouse gas emissions will be significantly altered by the proposed scheme, as a reduction in the stop-go nature of the congested current network reduces CO2 emissions, while an increase in average speed above 45mph increases CO2 emissions.
Describe any likely impacts on the Ramsar Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.
Interference with key relationships that define the function of the site	Possible disturbance of Whooper swans on grazing areas outside of the site could cause birds to lose foraging time, and expend energy avoiding the disturbance. Thus reducing the birds' fitness and ability to survive and impacting on the function of the site as winter bird habitat.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No habitat loss within the Ramsar Site. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan have been recorded under the scheme footprint.
Disturbance to key species	There could be a significant effect subject to mitigation.
Habitat or species fragmentation	Unlikely to be a significant effect as all foraging habitat utilised by Whooper swan will remain.
Loss	The project will not cause direct loss of Whooper swan. Should disturbance be significant enough to cause abandonment of the preferred grazing areas there could be indirect mortality of Whooper swan.
Fragmentation	No disruption of the Ramsar Site will occur. However, potential exists for disturbance during construction and operation to disrupt the natural foraging/roosting site interactions of Whooper swan. This could have a significant effect on the Ramsar Site.

Table 3.2 DMRB Screening Matrix for Lough Neagh & Lough Beg Ramsar Site	
Disruption	Not significant.
Disturbance	No habitat loss within the Ramsar Site. Approximately 40ha of potential foraging habitat loss west of the existing A5, although no Whooper swan have been recorded under the scheme footprint.
Change to key elements of the site (e.g. water quality, hydrological regime etc)	There could be a significant effect subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of screening stage (delete as appropriate).	Significant effect possible on Whooper swan.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**YES** See Appendix 10

3.1.2 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for both Ramsar sites, through the parallel HRA assessment process:

- that the proposed Scheme is a project which is not connected with or necessary to the management of the implicated Ramsar sites;
- that by virtue of the Schemes' proximity to, hydrological connectivity with, and/or localised crossing of associated watercourses and other functional habitat, and given the clarification on interpretation though recent case law, the likelihood of the proposed Scheme having a significant effect on the sites cannot be excluded on the basis of reasonable scientific certainty and information; and
- that, even though not required under Ramsar legislation, a more detailed assessment (e.g. such as using Stage 2 Appropriate Assessment methodology) should be undertaken.

4 Stage 2 Assessment

4.1 Introduction

4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Ramsar Sites. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:

- A description of the Ramsar sites that will be considered in the Stage 2 Assessment;
- A description of significant impacts on the conservation feature of these sites likely to occur from the Plan
- Mitigation Measures; and
- Conclusions.

4.2 Scope of the information to inform the Stage 2 Assessment.

4.2.1 This section describes the data sources and studies undertaken, the methodologies applied and design parameters taken into account, to inform this stage of the HRA process, and follows on from the information presented in the Screening Tables above. This section addresses:

- loss of feeding habitat (functional habitat)[4] at Dunnalong/Thorn Hill and Grange Foyle outside of the Ramsar Sites and which is used by wintering birds associated with the Ramsar Sites; and
- disturbance of wintering birds associated with the Ramsar Sites during their use of feeding habitat outside of the Ramsar Sites at Dunnalong/Thorn Hill and Grange Foyle;
- Atlantic salmon and sea lamprey;
- Assessment of adverse effects on site integrity.

Loss of feeding habitat used by wintering birds associated with the two Ramsar Sites

4.2.2 The assessment has involved quantification of the extent of available feeding habitat within the Dunnalong /Thorn Hill and Grange Foyle areas and comparison with the total extent of such habitat available in the two areas.

[4] Habitat outside of a designated site which is used / relied on by species associated with the designated site

Implications of Climate Change

4.2.3 Long term climate change predictions (to 2080)[5] indicate that natural winter precipitation is predicted to increase, with more frequent extreme winter events. By contrast, summer temperatures will increase and precipitation is likely to decrease. The implications of these changes to population numbers of migratory birds are difficult to predict due to their lifecycle being partly outwith the UK, however it is likely that the areas of land currently used for foraging will flood more often and to a greater extent. This may increase or decrease the areas of land potentially available for foraging, depending on topography, however these will be more likely influenced by agricultural policy and practice.

4.2.4 The potential for greatest disturbance of foraging birds however is in the short term, during the construction phases, which will experience limited climate change effects and will require no amendment to the current proposed adaptive monitoring and mitigation measures.

Disturbance of wintering birds associated with the two Ramsar Sites during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

Data Sources

4.2.5 The following data sources have been relied on:

- data provided in the A5WTC ES 2010, including surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2009 and April 2010;

[5] The project assessment parameters have been based on UK climate change predictions from 2009 (UKCP09). Accordingly, the validity of these forecasts has been reviewed as part of this HRA exercise, using the latest guidance from UKCP09, prior to its proposed update in 2018.

The guidance (*Is UKCP09 still an appropriate tool for adaptation planning? April 2016*) concludes that UKCP09 continues to provide a valid assessment of future climate change over land. In particular it demonstrates that UKCP09 is competitive with results from the most recent assessment by the International Panel on Climate Change (IPCC), (CIMP5), such that:

- Future changes in summer and winter temperatures are consistent between CIMP5 and UKCP09 projections;
- Future winter rainfall changes are consistent between both models.
- Both CIMP5 and UKCP09 projections agree that long term average of summer rainfall are more likely to reduce than increase, however CIMP5 predicts a larger chance of an increase in summer rainfall, and less risk of a substantial reduction than UKCP09. This is attributable to the use of different data sets.
- Notwithstanding, the guidance states that users should still continue to regard the full range of UKCP09 results as plausible outcomes for summer rainfall, to consider planning decisions.

The review has concluded that the most up to date projected changes to the baseline environment with regard to precipitation and surface flows in streams as a consequence of climate change, remain the same as those used in the EIA and previous HRA reports. For summer precipitation and river flows, UKCP09 represents a worse-case scenario and under the precautionary principal, has been appropriately adopted as the working assumptions for the Scheme and in this HRA.

- data provided in the A5WTC ES 2016, including site surveys undertaken at Dunnalong/Thorn Hill and Grange Foyle between October 2013 and April 2014 by the Mouchel (now WSP) assessment team; and

- data for use of the area by Whooper swan for 2010-2013 provided by the Irish Whooper Swan Study Group. .

Impact assessment

4.2.6 There are no generally accepted thresholds for the loss of functional habitat or the numbers of birds which may be disturbed and displaced in the short-term or long-term from areas of functional habitat. Determination of whether either or both is likely to have a significant effect on the area of functional habitat and the species which use / are reliant on the area with consequent effects on the integrity of a designated site is necessarily context specific.

4.2.7 In the case of the Ramsar sites considered in this report, habitat loss has been quantified and represented as a percentage of the habitat which surveys have indicated are used and the overall extent of potential functional habitat within the area in the vicinity of the proposed scheme.

4.2.8 Potential for disturbance of the Whooper swan and Greylag geese which annually utilise the area has been considered relative to sources of disturbance during construction and operation and identification and consultation with NIEA and RSPB regarding mitigation measures with a particular focus on construction activities which are likely to involve higher and tonally distinct noise levels and characteristics. A detailed literature review has been carried out for the purposes of HRA and is included within this report. Reference to peer reviewed scientific studies on the impacts of disturbance upon birds, combined with the detailed assessments carried out and reported within the 2010 ES and 2016 ES, enables the assessments to be carried out and conclusions reached which are beyond the threshold of reasonable scientific doubt required by the Birds and Habitats Directives.

Disturbance or harm to Atlantic salmon and sea lamprey associated with the two Ramsar Sites

Baseline Data sources

4.2.9 The following data sources have been relied on:

- data provided in the 2010 and 2016 ES;

- data derived from site surveys undertaken between 2012 and 2014 by the Mouchel (now WSP) assessment team at specific locations where the provision of bridges, culverts, watercourse diversions and drainage outfalls will involve construction on watercourses within the wider Foyle Catchment to establish the presence, potential presence or absence of salmonid holding (resting), spawning or nursery habitat in the specific locations;

- data derived from surveys undertaken by Loughs Agency (July 2017) along sections of watercourses where the proposed of bridges, culverts, watercourse diversions and drainage outfalls are located to establish the presence, potential presence or absence of salmonid holding, spawning or nursery habitat in the relevant sections.

4.2.10 Where either or both of the two sets of data relating to location-specific and section-related salmonid interest have indicated salmonid presence or potential they have been classified as sections of salmonid watercourse. For the purposes of this initial assessment, and in keeping with a precautionary approach, it has been assumed that all watercourses with salmonid potential are utilised by Atlantic salmon.

4.2.11 The location-specific site surveys were undertaken in August and September 2012, July to September 2013 and January 2014. The surveys were conducted in accordance with guidance issued by the former Department of Agriculture for Northern Ireland (Fisheries Division) and agreed with Loughs Agency. The relevant watercourses were surveyed 250m upstream and downstream from each bridge, culvert, watercourse diversion or outfall. The following data was collected:

- Flow velocity – this was taken where possible using an in-stream flow meter with impeller to provide a count or measured by timing a floating object over a known distance, velocity has then been calculated using the count, depth and width measurements – the flow velocity is critical to keep eggs/fry in a spawning/ nursery area well oxygenated,

- In-stream vegetation – presence and extent was estimated looking downstream to the left and right – in-stream vegetation can provide adequate cover in the nursery habitat as shelter from predators,

- The extent of mature scrubby bank cover where present – mature scrubby vegetation can provide cover for nursery areas as well as stability and cover in holding areas,

- The extent of overhanging bank cover where present – overhanging tree and scrub cover can enhance the food supply available for fry in nursery areas by way of insects dropping off branches into the water,

- Water depth – the depth of the water is important for all three habitat classifications. Adequate depth in spawning areas ensures that redds[6] are covered by water at all times. Shallow water in the nursery area makes the fry less vulnerable to predation not only from larger fish but also rippling of the water surface makes them less easily seen by birds. Deeper water allows adult fish to rest where the minimum energy is required to stay on station,

[6] A redd is a spawning nest dug in gravels of the stream bed by fish, especially salmon

- Water width – this measurement has been used in combination with depth to calculate flow velocity,

- Substrate type – this has been measured as a percentage of bedrock, boulder, cobble, gravel, fines, sand, silt and mud – a stable substrate in holding areas allows adult fish secure resting areas on a staged ascent/ descent of the river. A stony substrate provides good shelter from predators and creates more territory space allowing it to accommodate more fry in the nursery area. This stable environment also will invariably have more invertebrates living on the stones as a source of food for the fry. The presence and size of gravel is critical for the creation of a redd in salmonid spawning areas whilst the presence of large quantities of finer silt material with gravel can cause compaction of the gravel making redd construction more difficult and reduce oxygen supply to the eggs,

- Gravel depth – the depth of gravel and, thereby, the potential depth of a redd exerts a strong influence on spawning in relation to the size and type of fish able to lay eggs in an area.

Information to support the assessment of potential impacts

4.2.12 The assessments relative to impacts associated with the future use of the proposed scheme have focused on:

- discharge of sediments and pollutants from drainage outfalls which could result in the smothering of salmonid habitat and harm to fish as they pass through the relevant section of watercourse;

- fragmentation associated with obstruction of passage along watercourses; and

- the potential for scour and changes to velocity of discharge to damage gravel bed spawning habitats (addressed above).

4.2.13 The data collected from the location-specific surveys has been reviewed and each location has been classified relative to its salmonid potential in accordance with the Annex 1 Habitat Classification detailed in the Fisheries Division guidance. Each location has been categorised relative to holding spawning or nursery habitat into one of four grades, grade 1 being optimal habitat and grade 4 indicating an absence of habitat or habitat which is failing. Only locations with classifications of 4 relative to all three holding, spawning or nursery habitat types have been excluded as not being of salmonid interest.

4.2.14 With regard to scour and increases in velocity, long term climate change projections indicate that natural winter precipitation is predicted to increase, with more frequent extreme winter events with consequent increases in river flows. By contrast, summer temperatures will increase and precipitation will likely decrease. As a function of runoff volume, there will be reduced river flows in summer.

4.2.15 In the long term, it is predicted that the Q95 flows in watercourses in Northern Ireland will reduce due to the warmer drier summers. In other words, low flows in watercourses are

projected to decrease over time by the order of +12% (increase) to -21% (reduction) by the 2020s, and -17% to -41% by the 2080s (UKPC09, Murphy *et al* 2009).

4.2.16 In view of these long-term projections of hotter and drier summers and reduction in Q95 the impact assessment has been updated to contain consideration of the potential for scour and changes to velocity of discharge with regard to river bed habitat.

Information used to determine mitigation measures

4.2.17 Information relating to the nature of the construction activities which will be required to install the proposed bridges, culverts, watercourse diversions and drainage outfalls has been confirmed by DfI's appointed contractors for the proposed scheme. Consideration has also been given to sections of watercourses which will be located within 50m of the proposed working areas and, hence, where the risk of migration of sediments over ground, particularly during rainfall, could have an impact on water quality and /or marginal and aquatic habitats. The assessment has involved consideration of the risk taking into account proposed mitigation measures which have been agreed with the contractor advisors and which will be incorporated into a Construction Environment Management Plan (CEMP) and Silt Management Plan (SMP) which contractors will be required to adopt during construction.

4.2.18 The assessments relative to impacts associated with the construction phase of the proposed scheme have focused on discharge of sediments from drainage outfalls which could result in the smothering of salmonid habitat, harm to fish as they pass through the relevant section of watercourse and fragmentation associated with obstruction of passage along watercourses.

4.2.19 The effectiveness of the mitigation measures delivered through the CEMP, and the SMP will be monitored via an Adaptive Monitoring Plan, in which conservative threshold targets will be set and intensely monitored over the construction period. DfI is aware that the final responsibility for ensure no adverse impacts on the integrity of the Ramsar Sites rests with themselves, and will implement ongoing monitoring of the effectiveness of the CEMP and the SMP through the implementation of standard audits of contractor compliance and through an Adaptive Monitoring Plan.

4.2.20 A construction phase threshold in concentrations of in-stream sediment, measured as Total Suspended Solids (TSS) above background levels, will be determined in accordance with the updated Common Monitoring Standards for Freshwater Fauna (CSMFF)[7]. These Standards will be adhered to during construction for watercourses identified as having Atlantic salmon spawning or nursery interest.

4.2.21 Targets levels will be set at two levels to trigger action, namely an 'Investigation' level; where the source of any elevation over expected baseline variation will be determined (i.e. is it arising from the construction or from other causes, and an 'Action' level in which immediate mitigation will be put in place, including the possibility that all works must cease until the cause of any

[7] Common Standards for Monitoring: Freshwater Fauna (JNCC October 2015). Updated from 2005.

increased sediment/ or contaminants is discovered, appropriately managed and water quality levels return to normal.

4.2.22 In relation to discharge of sediments and other road related pollutants from the proposed road drainage networks, analysis and calculations have been undertaken to establish if design parameters agreed with NIEA and Loughs Agency, will be likely to be achieved and if water quality relative to sediments and other pollutants, such as metals and hydrocarbons, associated with road related run-off will prove acceptable in the context of the ecological status of the watercourses using the Highways Agency Water Risk Assessment Tool (HAWRAT). The HAWRAT is an assessment tool which is recommended in Volume 11 of the DMRB and which has been agreed with the statutory bodies responsible for water quality throughout the UK. NIEA has agreed it as the appropriate means of assessing the discharge concentrations for the proposed scheme. The outcome from the application of the HAWRAT is that a discharge will either pass or fail in light of the predicted concentrations of sediments and other pollutants and the sensitivity for the receiving watercourse. Where the evaluation has indicated an outfall will fail, appropriate combinations of mitigation measures have been identified and the evaluation has been re-run until the outfall achieves a pass.

4.2.23 The proposals have been based on the following design parameters:

Construction

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- adoption of a target limit of 50mg/l end of pipe TSS level at all discharges to watercourses in accordance with NIEA Water Management Unit (WMU) requirements[8];
- adoption of a 25mg/l maximum uplift against background TSS levels for non-sensitive watercourses, and a maximum uplift in accordance with CSMFF for sensitive watercourses, as agreed with Loughs Agency;
- adoption of the Q90[9] velocity for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency;
- a limiting discharge velocity depending upon the sensitivity of the habitat of the receiving watercourse.

[8] NIEA WMU set a standard discharge limit for construction sites across Northern Ireland of 50mg/l TSS end-of-pipe discharge. This limit is set so that water flowing from a site has a maximum level of suspended sediment which can readily be diluted by the receiving watercourses to levels which are safe for salmonids.

[9] The Q90 velocity is the rate which is exceeded 90% of the time in a watercourse, and is calculated using computer modelling of the watercourse's catchment.

Operation

- adoption of the 1 year, 5 minute duration, return period storm event with an additional 20% allowance for climate change;
- outfalls must pass HAWRAT and EQS tests for sensitive watercourses;
- adoption of the $Q90^{10}$ velocity for receiving watercourses for the purposes of calculating TSS concentrations in receiving watercourses following treatment as agreed with Loughs Agency;
- a limiting discharge velocity depending upon the sensitivity of the habitat of the receiving watercourse.

4.2.24 Evaluation of the 50mg/l discharge threshold at outfalls has involved adoption of the standard TSS value of 116mg/l for untreated road and identification of appropriate combinations of mitigation measures for inclusion in the drainage design to achieve a minimum 57% sediment treatment required to achieve the threshold. The untreated TSS value has been taken from Phase 2 of the Improved Determination of Runoff from Highways Project (Crabtree et al, 2007).

4.2.25 The calculations relating to the 25mg/l downstream concentrations have involved use of the local standard annual average rainfall value in combination with the impermeable area of each drainage network to establish an annual volume of water draining through each network to outfall. The standard TSS value of 116mg/l for untreated road runoff adopted for evaluation of the 50mg/l discharge threshold has been applied. The sediment loading has been compared to the receiving annual water flow volume and TSS data for the receiving watercourse. Data for TSS was gained from a combination of Loughs Agency and NIEA Monitoring Stations and surveys undertaken by WSP prior to the publication of the A5WTC ES 2010. For the 2016 ES publication updated data was provided by NIEA and Loughs Agency. Where the calculation has indicated a concentration will exceed the in-stream threshold, appropriate combinations of mitigation measures have been identified and the calculation has been re-run until the outfall achieves a pass.

4.2.26 The identification of the specific mitigation measures proposed for each drainage outfall has involved the adoption of the most onerous combination of measures in light of the outcome of all three evaluations.

4.2.27 Where more than one outfall discharges into the same reach of a watercourse the combined impacts will be more significant. In these circumstances the outfalls were subject to an aggregate assessment in HAWRAT.

4.2.28 To aggregate the outfalls the drained areas were simply added together. The location on the watercourse used for the cumulative assessment was positioned downstream of the last outfall in the reach. For this purpose a reach is defined as a length of watercourse between two

confluences, as the available dilution and stream velocity will naturally change at confluences and influence the assessment.

4.2.29 Watercourse reaches can vary greatly in length. Therefore, for the assessment of the impacts of soluble pollutants, only outfalls within 1km of each other along the length of a watercourse were aggregated for cumulative assessment. When assessing the combined impact of sediment bound pollutants, outfalls within 100m of one another were assessed. Beyond 100m, the road runoff sediment is likely to be sufficiently diluted with natural sediments so as not to have an adverse impact[11].

4.3 Determination of adverse impact relative to integrity

4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Ramsar sites. The assessment determines whether there is likely to be:

- a reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and

- whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.

4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in Appendix 8.

4.3.3 The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system*, which defines integrity in the context of designated site as:

> *The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.*

[11] In accordance with DMRB Volume 11 Section 3 Part 10 HD45/09 Annex I

5 Description of the proposed scheme

5.1 Alignment and relationship to the functional habitat associated with the Ramsar Sites

5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to the Ramsar sites is shown in Appendix 1 - Figure 1.

5.1.2 The section of the proposed scheme corridor which is of relevance to the Ramsar sites is that between Magheramason and the Burn Dennet. Here, the proposed dual carriageway will generally be located between 0.3 and 1.8km east of the River Foyle. It is an area of mixed arable and agricultural grassland some 40% of which is within the River Foyle floodplain. Parts of the area are used annually by Whooper swan and Greylag geese associated with the Ramsar sites for feeding[12].

5.1.3 Detail relating to the peak counts for whopper swan and Greylag geese during the 2009 – 2010 and 2013 – 2014 surveys in the Foyle floodplain is provided in Appendix 11O of the 2016 ES. The location of the birds observed is shown in Appendix 1 Figures 11.67 to 11.68 of that document (reproduced in Appendix 1- Figures 2 and 3 of this report).

5.1.4 Over this section, the proposed scheme follows a north-south alignment which broadly reflects that of the existing A5. Between Magheramason and Bready it will be located some 200-250m west of the existing road and will be on embankment as it crosses Meenagh Road and approaches a proposed bridge over the existing A5, Victoria Road north of its existing junction with Cloghboy Road. South of the new bridge, the alignment will initially encroach onto the lower western-facing slopes of Sollus Hill in deep cutting. As the dual carriageway continues south it will be some 200m east of the existing road. It will emerge from the cutting and follow an alignment roughly parallel with the A5, crossing beneath Donagheady Road, and following a gentle curve to the south-west, passing between Willow Farm and housing on the A5,Victoria Road. It will cross Willow Road in shallow cutting and rise on high embankment to enable it to be bridged over the A5, Victoria Road. The dual carriageway will descend from the bridge to cross Ash Avenue on low embankment before rising again onto high embankment and crossing Drumenny Road via a new bridge before approaching and crossing the Burn Dennet via a new open span bridge.

5.1.5 Construction of this section, other than at Sollus Hill, will involve the use of large excavators, dump trucks for transporting excavated materials to areas of fill within the working areas, bulldozers, graders, compaction plant including various rollers and soil stabilisation plant. It is not anticipated there will be a need for blasting, the break out of rock at Sollus Hill being implemented by way of rock breakers.

[12] Either regularly during the winter, or during migration to and from the Ramsar sites

5.2 Bridges

5.2.1 Open span bridges are proposed where the dual carriageway crosses the seven principal rivers within the Foyle Catchment, namely the Burn Dennet, Glenmornan River, River Mourne, River Derg, Fairy Water, Drumragh River and the Routing Burn.

5.3 Culverts and piped watercourses

5.3.1 Wherever the proposed scheme crosses watercourses, other than the seven rivers described above, the proposals provide for the introduction of a culvert on the existing line of the watercourse or a culvert which forms part of a diverted section of watercourse. The latter approach is to be adopted where the angle of the crossing would require an overly long culvert or relative levels between the carriageways and existing channel of the watercourse require diversion to achieve appropriate clearances.

5.3.2 A total of 107 culverts are proposed within the Ramsar sites catchment. These are scheduled in Appendix 2 and indicated in Figures 4-9 in Appendix 1. Selection of the form of culvert to be provided relates to the volumes of flow, context relative to floodplains and status relative to salmonids. Box culverts are proposed were volumes and/or the flooding regime indicates a need. They are also provided where the sections of watercourse have been identified as ones with salmonid presence or potential identified in accordance with the data, surveys and criteria described section 4. Those where salmonid potential has informed the selection of box culvert are indicated in the schedule in Appendix 2.

5.3.3 The design for culverts provided in light of the salmonid potential of a watercourse allows for a 350mm embedding of the culvert base below existing ground level and import of boulders and clean gravels which have been screened to ensure no invasive species are imported. The boulders and gravels will be substantially filled to the embedded depth to recreate suitable habitat and allow the generation of a narrower channel during periods of lower flow. The channel will not be completely filled to allow for natural recruitment of river bed material and formation of a ‘natural’ channel.

5.3.4 Loughs Agency have, however, identified 2 new culverts on undesignated watercourses (culvert ref S2-PC-01 on watercourse UD 15 and culvert ref S2-PC-12 on UD 26) which because of their sensitivity and value, require to be open span structures which do not disturb the channel bed. A further 2 culverts have been identified as requiring box structures rather than pipes (culvert ref S1-PC-25 on watercourse UD 10 and culvert ref S3-PC-66 on UD 61.2).

5.3.5 Boulders will also be located upstream and downstream of the culverts to enhance the value of these locations as resting areas prior to and following the passage of fish through the structures. Placement of the boulders and gravels within the culverts and upstream and downstream of them will be undertaken in consultation with Loughs Agency personnel.

5.3.6 Construction of all culverts will involve either the introduction of a temporary diversion to maintain flows and passage along the watercourses where the culvert is on line or the completion of construction of the culverts on diverted sections or watercourse in advance of the abandonment of the existing section of watercourse which is being diverted.

5.4 Watercourse diversions

5.4.1 A total of 77 watercourse diversions are proposed along watercourses located within the Foyle and Tributaries catchment. They are scheduled in Appendix 3. Their location is indicated in Figures 4-9 in Appendix 1. The schedule in Appendix 3 also indicates those sections of watercourse which have been identified as being of salmonid interest.

5.4.2 The construction of all watercourse diversions will involve the completion of construction of the diversions in advance of the abandonment of the existing section of watercourse which is being diverted.

5.5 Drainage and outfalls

5.5.1 The drainage strategy for the proposed scheme provides for discharge of road related run-off to existing watercourses. It includes a range of Sustainable Drainage Systems (SuDS) features focused on the interception and reduction in concentrations of sediments and other potentially harmful substances which are either suspended or in soluble form within road related run-off prior to discharge, as well as measures to ensure the outfall does not cause scour of sensitive salmonid habitats, or displacement of fish. Measures include the use of grassed surface water channels, attenuation ponds and wetlands. Discharges will be subject to DfI - Rivers approval prior to commencement off construction.

5.5.2 The proposals have been based on the design parameters described in 4.2.22.

5.5.3 A total of 151 drainage outfalls are proposed to watercourses within the River Foyle Catchment. These are scheduled in Appendix 4. Their location is indicated in Figures 4-9 and Sheets 1-24 in Appendix 1. The schedule also indicates the design/mitigation measures which are proposed at the various outfalls which have been included to facilitate achievement of the design parameters relative to TSS concentrations and HAWRAT parameters relative to pollutants.

5.5.4 Construction of the proposed outfalls will involve localised removal of bankside and marginal vegetation and installation of headwalls, wingwalls and aprons as indicated in the typical outfall detail provided in Figure 10.

Mitigation through design

5.5.5 Management of the discharge water quality, quantities, flow rates and velocities into the SAC watercourses, and incorporation of these measures into the design of the Scheme is considered the most important consideration for maintenance of the integrity of the SACs.

5.5.6 The drainage strategy for the proposed scheme is described in 5.5.1, these design measures provide significant mitigation of potential effects.

5.5.7 Without considering effects of changes in water quality, salmonid fish are prone to favour water with higher flow rates as these conditions are likely to be more desirable because of greater dissolved oxygen levels and their tendency to remove the finer particulate material so keeping gravels in the basal substrate clean. Water velocities, however, should not be so high that they

are likely to cause consistent or extensive scour of the gravels within the substrate, although peaks of very high water flow are likely to have negligible adverse effects in the long term. Long terms climate change forecasts of hotter and drier summers, and the projected reduction in Q95 exceedance for surface water flows across Northern Ireland, has the potential to affect dissolved oxygen demand and salmonid use of the rivers, as well as to exacerbate the risk of scour due to flashy discharges. For this reason a precautionary principle when designing outfalls has been applied. This approach means that water velocities downstream of proposed outfalls post-construction should contain water flows to within the recommended ranges for salmonids (see below), or lower than the highest peak velocity currently occurring at each location. Where post-construction water velocities are anticipated to be consistently higher than the recommended ranges (for example, projected long term winter runoff and surface water flows and additional discharge from the road), water flow monitoring at these locations will occur to determine the natural ranges at those points and guide the design of any required flow control measures.

5.5.8 Recommended water velocities for salmonids, taken from Ecology of the Atlantic Salmon[13] are as follows:

- Spawning: 25–90 cm/ s
- Nursery: Fry and underyearling 50 to 65 cm/s, yearling and older 60–75 cm/s

5.5.9 The results of the Outfall Discharge Velocity Assessment are outlined in Appendix 9. Without further knowledge of the river habitat all the outfalls in Appendix 9 will be considered to discharge to watercourses of salmonid interest and therefore sensitive to discharge velocities. Unless no salmonid interest in the watercourses is confirmed through further survey, then these outfalls will be subject to the limits on the water discharge velocities outlined above and detailed in Appendix 9.

5.6 Lighting

5.6.1 The dual carriageway will not be lit other than at the proposed junctions. Lighting will accordingly be located in the vicinity of several watercourses identified as having salmonid interest associated with the wider River Foyle Catchment.

5.7 Temporary structures

5.7.1 Temporary clear span structures are proposed for crossing the Burn Dennet, Glenmornan, River Derg and the Fairy Water. These structures will be required for the duration of the construction of the appropriate phase (approximately 3 years).

13 http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=SMURF_salmon.pdf

5.7.2 During construction smaller existing watercourses will need to be crossed until the mainline of the proposed scheme is structurally complete, at which point the temporary crossing can be removed. Following discussion with Loughs Agency it has been agreed these watercourses will be crossed using single bore pipes placed in stream with suitable cover placed over the pipe.

5.7.3 Where a smaller watercourse is to be provided with a pipe culvert in the final design, this culvert will be constructed and used as the crossing during construction of the remainder of the phase.

6 The Two Ramsar Sites

6.1 Introduction

6.1.1 The location, extent and relationship of the two Ramsar Sites to the proposed scheme is indicated in Figure 1 in Appendix 1. Details relating to the habitats and species identified as the primary reason for selection as a Ramsar Site and qualifying species are described in Table 6.1. A comment on the vulnerability of the site is included. The information has been obtained from the Ramsar Site Information Forms obtained from the Ramsar Site Information Service website (www.ramsar.wetlands.org). The Ramsar Site Information Forms are enclosed in Appendix 7.

Table 6.1 Site Descriptions

Site Name	Designation & Code	Ramsar Criteria Details Rationale for Criteria	Vulnerability
Lough Foyle	Ramsar 3UK133	1, 2, 3, 5, 6[14]	Introduction of invasive species of plant e.g. *Spartina spp.*
		Ramsar criterion 1 This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches. This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural functioning of a major river basin which is located in a trans-border position.	
		Ramsar criterion 2 The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad *Alosa alosa*, twaite shad *A. fallax fallax*, smelt *Osmerus eperlanus* and sea lamprey *Petromyzon marinus*, all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon *Salmo salar* migrate through the system to and from their spawning grounds.	
		Ramsar criterion 3 The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of Whooper swan *Cygnus cygnus*, light-bellied brent goose *Branta bernicla hrota* and bar-tailed godwit *Limosa lapponica*. Additional wildfowl species which are nationally important in an all-Ireland context are red-throated diver *Gavia stellata*, great	

[14] Ramsar Selection Criteria are explained in Appendix 7

Site Name	Designation & Code	Ramsar Criteria Details Rationale for Criteria	Vulnerability
		crested grebe *Podiceps cristatus*, mute swan *Cygnus olor*, Bewick's Swan *C. columbianus*, Greylag goose *Anser anser*, shelduck *Tadorna tadorna*, teal *Anas crecca*, mallard *Anas platyrhynchos*, wigeon *A. penelope*, eider *Somateria mollissima*, and red-breasted merganser *Mergus serrator*. Nationally important wader species are oystercatcher *Haematopus ostralegus*. golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, dunlin *C. aplina*, curlew *Numenius arquata*, redshank *Tringa totanus* and greenshank *T. nebilaria*.	
		Ramsar criterion 5 The site supports about 29000 migrating birds. Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7.	
		Ramsar criterion 6 Qualifying Species/populations (as identified at designation): *Species with peak counts in spring/autumn:* Whooper swan, *Cygnus cygnus*, Iceland/UK/Ireland Light-bellied brent goose, *Branta bernicla hrota*, East Canada/Ireland *Species with peak counts in winter:* Bar-tailed godwit, *Limosa lapponica lapponica*, W Palearctic Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm. See Sections 19/20 of the Ramsar Information Sheet in Appendix 7 for details of noteworthy species Details of bird species occurring at levels of National importance are given in Section 20 of the Ramsar Information Sheet in Appendix 7.	

Site Name	Designation & Code	Ramsar Criteria Details Rationale for Criteria	Vulnerability
Lough Neagh & Lough Beg	Ramsar 3UK009	1, 2, 3, 4, 5, 6, 7[15]	Eutrophication and pollution by fertilisers.
		Ramsar criterion 1 A particularly good representative example of natural or near-natural wetlands, common to more than one iogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore.	
		Ramsar criterion 2 Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or animal or an appreciable number of individuals of any one of these species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort *Elatine hydropiper*, marsh pea *Lathyrus palustris*, Irish lady's tresses *Spiranthes romanzoffiana*, alder buckthorn *Frangula alnus*, narrow small-reed *Calamagrostis stricta* and holy grass *Hierochloe odorata*. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp *Mysis relicta*, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, *Stenus palposus* and *Dyschirius obscurus*, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly.	
		Ramsar criterion 3 This site is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of	

[15] Ramsar Selection Criteria are explained in Appendix 7

Site Name	Designation & Code	Ramsar Criteria Details Rationale for Criteria	Vulnerability
		special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large number of plants and animal species are confined or almost confined to this area within Northern Ireland.	
		Ramsar criterion 4 This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe *Podiceps cristatus*, gadwall *Anas strepera*, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, snipe *Gallinago gallinago* and redshank *Tringa totanus*. Other important breeding wetland species include shelduck *Tadorna tadorna*, teal *Anas crecca*, shoveler *Anas clypeata*, lapwing *Vanellus vanellus* and curlew *Numenius.arquata*.	
		Ramsar criterion 5 Assemblages of international importance: *Species with peak counts in winter:* 86639 waterfowl (5 year peak mean 1998/99-2002/2003) Species and numbers are listed in Section 20 of the Ramsar Information Sheet in Appendix 7.	
		Ramsar criterion 6 Qualifying Species/populations (as identified at designation): *Species with peak counts in spring/autumn:* Tundra swan, *Cygnus columbianus bewickii*, NW Europe *Species with peak counts in winter:* Common goldeneye, *Bucephala clangula clangula*, NW & C Europe Common pochard, *Aythya ferina*, NE & NW Europe Greater scaup, *Aythya marila marila*, W Europe Tufted duck, *Aythya fuligula*, NW Europe Whooper swan, *Cygnus cygnus*, Iceland/UK/Ireland	

Site Name	Designation & Code	Ramsar Criteria Details Rationale for Criteria	Vulnerability
		Species/populations identified subsequent to designation for possible future consideration under criterion 6. *Species with peak counts in spring/autumn:* Great cormorant, *Phalacrocorax carbo carbo*, NW Europe Mute swan, *Cygnus olor*, Britain More contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm.	
		Ramsar criterion 7 The site supports a population of pollan *Coregonus autumnalis*, one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco.	

7 Potential impacts and mitigation

7.1 Loss of feeding habitat used by wintering birds associated with the Ramsar Sites

7.1.1 The area of the Foyle floodplain between Magheramason in the north and the Burn Dennett in the south has been identified by RSPB and the Irish Whooper Swan Study Group as the area of functional habitat for which there is an interaction between the proposed scheme and the qualifying species of the Ramsar sites, due to the use of the area by birds associated with the Ramsar sites for foraging, either as a regular winter foraging area, or during migration to and from the Ramsar sites. Significant numbers of birds associated with the Ramsar sites have been recorded within the Foyle floodplain, thus the potential impact of the scheme may be significant in terms of the integrity of the Ramsar sites and requires further assessment to determine if that is indeed the case.

7.1.2 There is approximately 1200 ha of potential foraging habitat within the area.

7.1.3 Figures 2 and 3 in Appendix 1 provide peak count numbers and locations of all recorded qualifying bird species for the surveys undertaken in 2009-2010 and 2013-2014 respectively. The numbers demonstrate that the area is used by two species, Whooper swan and Greylag goose. They also demonstrate that numbers for 2013-2014 have been significantly lower than the numbers recorded in 2009-2010 and that fewer parts of the area have been used. Discussion with RSPB NI indicated that birds were using foraging areas within the RoI, outside of the survey area, and at a significant distance from the proposed construction. For the purposes of this assessment it has been assumed the higher numbers and more dispersed pattern recorded in 2009-2010 is more representative of the use of the area by birds associated with the functional habitat and is more likely to reflect the long term implications of wetter winters associated with climate change predictions.

7.1.4 Field survey results from 2013/2014 showed a peak count of 873[16] birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 46% of the Whooper swan utilising the Lough Foyle/Lough Swilly SPA complex in January 2005. A peak count of 22 birds from north of Dunnalong Road equates to approximately 1.2% of the Whooper swan utilising the Lough Foyle/Lough Swilly SPA complex based upon data from 2005. This represents a change in use pattern when compared to the 2009 A5 WTC EIA study (WSP, 2009), with fewer birds using the area north of Dunnalong Road and more within the Grange Foyle area.

7.1.5 Field survey results from 2013/2014 showed a peak count of 218 birds present on land within the area of the eastern floodplain, at Grange Foyle, approximately 9.2% of the Greylag geese utilising the Lough Foyle/Lough Swilly SPA complex. The single bird observed north of

[16] This peak count is a summation of all of the highest counts regardless of the month in which those counts occur, it is likely to be artificially high, but allows a robust and precautionary approach to impact assessment.

Dunnalong Road represents <0.1% of the Greylag geese utilising the Lough Foyle/Lough Swilly SPA complex.

7.1.6 During 2009-2010 an area of approximately 330 ha was used by up to 430[17] Whooper swan, and an area of approximately 150 ha was used by up to 350 Greylag geese. During 2013-2014 an area of approximately 130 ha was used by up to 205 Whooper swan, and an area of approximately 117 ha was used by up to 65 Greylag geese.

7.1.7 The proposed scheme will involve the loss of approximately 40 ha of land within the area of potential functional habitat representing some 3% of the total area of potential habitat. None of the land take will affect parts of the area where use by either species has been recorded in the two surveys periods. As can be seen from Figures 2 and 3 (Appendix 1), there are two core areas of usage by these birds within the study area, neither of which is subject to landtake by the Proposed Scheme. In addition, there are alternative feeding sites located elsewhere along the river.

7.1.8 In light of the small percentage of potential loss and absence of loss in areas where use has been demonstrated, it has been concluded there will be no need for mitigation in the form of provision of compensatory habitat. This conclusion is based upon the Source-Pathway-Receptor conceptual model of impact assessment.

7.1.9 In order for the existence of an impact to be proven, all three elements of the model must be extant in any given context. In this case the receptor is absent from potentially impacted areas. As no qualifying bird species have been shown to utilise the areas impacts, a corollary of that finding is that no impact is likely to arise which may adversely impact upon them.

7.2 Disturbance of wintering birds associated with the Ramsar sites during their use of feeding habitat at Dunnalong/Thorn Hill and Grange Foyle

The effects of disturbance on avifauna

7.2.1 Disturbance has the potential to produce negative impacts on wild bird populations. However, the way in which disturbance affects bird populations is complex and predicting impacts requires a detailed knowledge of how disturbance affects populations and how this varies between species. The aim of this section is to review relevant research with a view to understanding whether any of the predicted sources of disturbance are likely to have a negative impact on populations of birds using the area around the proposal and, in particular, whether this could have an unacceptable impact on any species associated with the Ramsar sites.

7.2.2 The role of disturbance on bird populations has been extensively studied both to identify problems with species of conservation concern and as a tool in deterring unwanted species from sensitive areas e.g. airports and valuable crops. While most organisations concerned

[17] These numbers represent the highest count during a single survey visit, and allow an accurate calculation of the area of forage habitat in use at any one time.

with management of the countryside actively encourage increased access to the countryside, the resultant increased disturbance can often have significant negative effects on wildlife.

7.2.3 There are two factors to consider when assessing the impact of human disturbance on feeding areas. First, does the disturbance lead to changes in behaviour? Second, does any consequent change in behaviour affect mortality, reproductive success or population size (Gill et al. 2001) The majority of studies on disturbance concentrate on the first factor in one of two ways: comparison of animal distributions between areas with and without disturbance (e.g. Tuite, Hanson and Owen 1984; Pfister, Harrington and Lavine 1992; Sutherland and Crockford 1993; Milsom et al. 2000), and observations of the direct effects of disturbance on behaviour (e.g. Draulans and van Vessem 1985; Belanger and Bedard 1989). Many studies of this type have focussed on shorebirds as they appear susceptible to disturbance and occur in areas used by large numbers of people (e.g. Burger 1981; Kirkby, Clee and Seager 1993; Smit and Visser 1993).

7.2.4 It is generally accepted that most waterfowl populations are limited by availability of food during the winter months (see Owen and Black 1990 for a review). The factors controlling the populations are thought to be “density-dependent” and lead to the population tending towards the “carrying capacity” i.e. the numbers an individual site can support. For example, when numbers of a species are relatively high, mortality will increase resulting in a decrease in the population. Conversely, when numbers are low, mortality will decrease until numbers increase to the carrying capacity of an area. In the case of waterfowl, density-dependence is thought to act through two factors. First, through the availability of prey/food during the winter months. Second, through the levels of fat birds can lay down prior to spring migration. This is important, as the breeding success of many species is directly related to the availability of reserves on arrival in the breeding grounds, especially for arctic-breeding waders and wildfowl.

7.2.5 The nature of the density-dependent factors and the timing of their impact need to be understood if meaningful management measures are to be employed. This is recognised in the models used to assess the “surplus” in wildfowl populations that can be exploited through wildfowling. In these models, mortality before the winter food “bottleneck” (when mortality becomes density-dependent) is termed “compensatory mortality” as the removal of birds at this time reduces the mortality during the population bottleneck. Mortality after the bottleneck, will result in a reduction in the population (as the population has already been reduced to the “carrying capacity”) and is termed “additive mortality”.

7.2.6 The recent development of incorporating behavioural ecology theory into conservation research has led to a much better understanding of how factors such as disturbance or habitat loss affect populations of wild animals (Sutherland 1998). In particular, studies of waterfowl populations have changed the way potential impacts should be assessed (Gill 2007, Stillman et al. 2007). These studies have led to an increased understanding of the roles of various potential threats to populations and have even led to the first models capable of predicting impacts of development on major estuarine sites (Durrell et al 2005).

7.2.7 Studying the impact of shellfishing at low tide on Oystercatchers on the Exe estuary, Stillman et al (2000), examined the role of disturbance in reducing access to feeding areas. This model was modified to take into account the time and energy costs associated with that disturbance,

including energy expended flying away from disturbance and feeding time lost as a result of the disturbance (West et al 2002). This study showed that disturbance from many small sources was more significant than fewer large scale sources and that disturbance could be more significant than habitat loss. However, the model also made recommendations on how to minimise the impact of the disturbance and that "preventing disturbance during late winter, when feeding conditions were worse, practically eliminated its predicted population consequences" (Stillman et al 2007). The model demonstrated that disturbance produced very little impact if restricted to daylight hours and if occurring before 1 December. Large-scale disturbance (10% of the site) produced less effect than numerous small events as this involved less commuting energy.

7.2.8 In a major study of wading birds on the Seine estuary, France, Durrell et al (2005) used a similar behaviour-based model to predict the impact of an extension to the port at Le Havre on the Seine estuary. They were able to assess the significance of;

- a reduction in available habitat;
- disturbance during the night and the day;
- the introduction of a buffer zone around the development;
- the effectiveness of introducing a new mudflat area as mitigation.

7.2.9 Supporting the findings of the effect of daytime disturbance on Oystercatchers on the Exe estuary, the authors found "when we simulated disturbance occurring during the daytime only, birds were able to feed within this area at night. In this case, the effect of disturbance was greatly reduced in dunlin and removed altogether in curlew and oystercatcher". Introduction of a 150m "buffer" zone "effectively removed the effect of disturbance on feeding shorebirds.

The effect of disturbance on exploitation of resources

7.2.10 The value of a site to a local population can be reduced where disturbance levels result in either reduced levels of exploitation or significantly increased costs associated with that exploitation e.g. commuting costs. Where disturbance may be chronic and birds excluded from feeding areas for long periods of time, feeding when disturbance levels are lower e.g. bad weather, early morning, may result in the same level of use as at sites where disturbance is minimal. The best way to directly assess the role of disturbance on the level of exploitation is to measure prey depletion where the study species is the only predator and where the prey species is non-renewing. This was studied in Black-tailed Godwits feeding on bivalves in the southeast of England. Gill et al. (2001) studied the levels of depletion in bivalve populations at sites experiencing a wide range of levels of disturbance. They predicted that disturbance could result in a slower rate of exploitation, leading to unused resources at the end of the winter. The level to which the resources are unused will determine the extent of the consequent reduction to carrying capacity of the site.

7.2.11 The study showed that even at sites with very high levels of disturbance (including a yacht club), Godwits visited the disturbed areas during periods of low disturbance and depleted prey to similar levels recorded at sites where disturbance was minimal. This demonstrated that the

value of a feeding area to a species may not be diminished as long as birds are able to feed sufficiently often to exploit the site fully.

7.2.12 Following "Ideal Free Distribution" theory, areas of high food availability will be preferred to areas of low availability. Where disturbance does result in reductions in foraging effort, food availability is likely to be greater than on adjoining undisturbed areas. When the source of disturbance is removed or habituated to (see below), birds would be expected to prefer these areas for foraging and, given sufficient time to exploit the resource, will deplete the resource to the same levels as the adjoining undisturbed areas. The key point in studying this type of scenario is to identify whether sufficient opportunities are available for sites/areas within sites, to be exploited fully.

Daytime feeding opportunities

7.2.13 Whooper Swans foraging on land at some distance from water must make daily commuting flights between roosting and foraging areas. In respect of such flights, three factors may safely be assumed to be implicated in the timing and duration of these flight; day length, temperature and safety. During midwinter birds naturally endure long periods of darkness, often combined with low temperatures, and it is probable that birds are likely to have lower morning energy stores than at other times of the year. Additionally, the impact of low temperatures and prolonged darkness is that less time is available for foraging as Whooper swans are visual feeders. Assuming that the time swans spend at their foraging grounds is positively correlated with energy requirements, in midwinter birds should arrive earlier at, and depart later from, their foraging areas. In addition, time spent feeding during the day should increase relative to day length. These conditions may induce an energetic bottleneck during December & January.

7.2.14 With regard to disturbance of the two species associated with construction of the proposed scheme, studies reported by Rees et al (2005) - Factors affecting the behavioural responses of Whooper swans (Cygnus cygnus) to various human activities noted that pedestrian presence disturbed Whooper swans when within 250-400m, and that construction vehicles disturbed Whooper swan when within 250m, in contrast to tractors which caused disturbance when within 150m and other farm vehicles which caused disturbance when within 250m.

7.2.15 The proposed scheme will generally involve construction significantly more than 250m from those parts of the area of functional habitat where the presence of the species has been has been recorded during the surveys. Locations closest to parts of the area where presence has been recorded are:

- where the realignment of Donagheady Road will bring the works within 50m of an area of recorded use, although the works will be separated from the swans by the existing A5 with its current levels of traffic (see Operational Disturbance below); and .
- where the proposed introduction of a new link road between Ash Road and Drumenny Road will involve work within 100m of a part of the area where a maximum of 9 swans were recorded in 2009-2010.

7.2.16 When considering opportunities for the swans and geese to forage for food, it is appropriate to consider available natural light. The period known as "Civil Twilight" is the time in which the

sun is <6° below the horizon and is the time during which it is considered light enough to work outside without the need for artificial light. During winter months Civil Twilight lasts approximately 30-35 minutes. Most visual foragers (including swans and geese) will be able to forage effectively during this time and it is likely foraging times will extend beyond this time.

7.2.17 Normal working times specified in the construction contract in relation to the control of noise and vibration are:

1st February to 31st October – 07:00 to 19:00 hours

1st November to 31st January – 08:00 to 17:00 hours

7.2.18 Therefore, it can be seen from Figure 1 below that during the winter months, there will be sufficient light available for foraging swans and geese during non-working periods in early October and again in early November[18], with a further period light enough for foraging occurring outside working hours from early February onward.

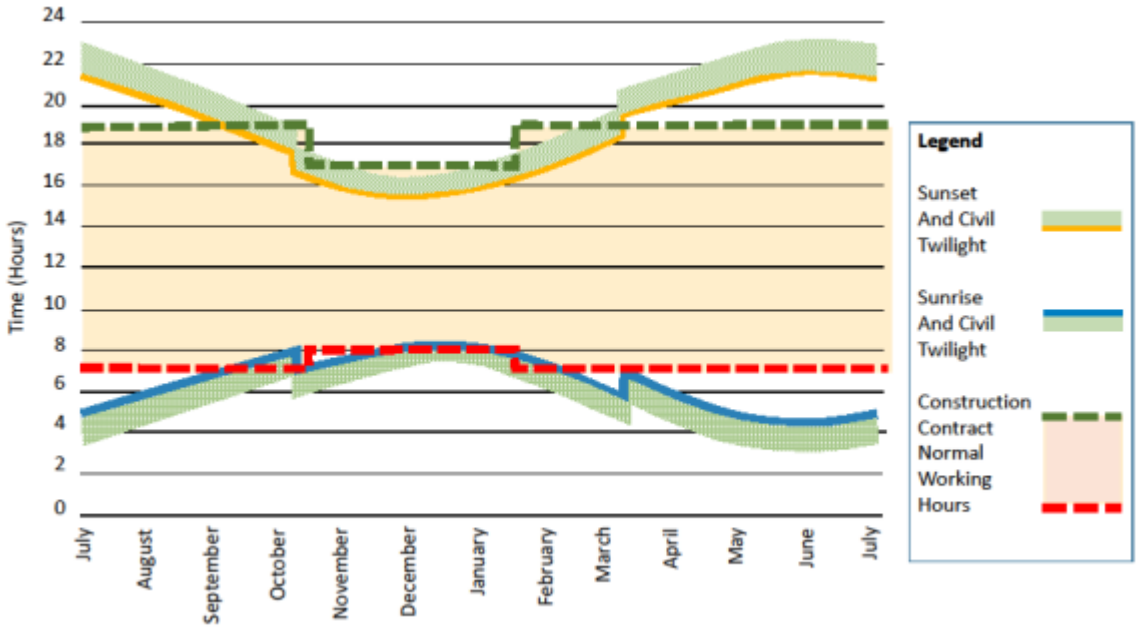

Figure 1: "Civil Twilight" hours in relation to time of year and normal working hours with respect to noise and vibration on the site within 250m of areas known to be utilised by swans and geese.

7.2.19 The limits of the contract working hours are particularly relevant to visual foragers as they are less likely to feed at night and daylight may affect the levels to which they can accrue resources. This could be of particular significance during energetically demanding times such as pre-migration fat deposition and moult.

[18] As clocks go back British Summer Time (BST) to Greenwich Mean Time (GMT) and it becomes light 'earlier'.

7.2.20 To minimise adverse disturbance effects upon Whooper swans during this period, there will be no heavy construction work between chainage 5000 and 10,500, within 250m of areas shown to be utilised by Whooper swans and Greylag geese. All construction in this areas would be conducted under the advice of an OCoW. Working hours within these areas will be reduced to between 08.00-17.00 hrs, between 1st October and March 31st, or as advised by the OCoW.

7.2.21 Adherence to the construction time periods, in accordance with OCoW instructions as set out above, will eliminate any potential for a reduction in available foraging opportunities as a result of construction between chainage 5000 and 10,500 known to be utilised by Whooper swans and geese.

7.2.22 The disturbance associated with the proposed development will not be continuous throughout. In view of the close proximity to other feeding areas elsewhere, birds would be likely to respond to periods of no disturbance by feeding preferentially within areas in proximity to the proposal site until the resource levels were similar to neighbouring areas.

7.2.23 A precautionary watching brief will be employed by a suitably qualified and experienced Ornithological Clerk of Works (OCoW). The OCoW will monitor Whooper swan and Greylag goose distribution and behaviour when works identified as potentially disturbing (e.g. noisy work, high numbers of personnel outside of vehicles etc.) are taking place. The watching brief will commence the day before planned activities and will cease the day following planned work. Should the OCoW determine that swans and geese are showing signs of significant disturbance, the ornithologist will immediately inform the Site Manager and Environmental Manager, and works will cease until foraging activity resumes. The following factors will be considered to be probative of detrimental disturbance.

- Physical displacement of birds (flight from source) with non-return within 5 minutes;
- Reduction in foraging activity due to increase in scanning times.

7.2.24 Implementation of the strategy outlined above will eliminate any potential for a reduction in available foraging opportunities as a result of construction between chainage 5000 and 10,500 known to be utilised by Whooper swans and geese.

The potential impact of Construction Activity and Noise

7.2.25 There are two locations where construction will involve noise levels above those associated with the general activities associated with movement and activity of plant and vehicles; where the deep cutting at Bready will involve breaking out of rock at Sollus Hill and where piling will be required for the bridge abutments at the Burn Dennet. The Bready cutting is some 400m from the closest recorded Whooper swan and over 1km from the closest recorded Greylag geese. The Burn Dennett crossing is some 500m from the closest recorded area known to be utilised by Whooper swan and over 2.5km from the closest recorded Greylag geese.

7.2.26 Scottish Natural Heritage (SNH) provide guidance on potential impacts on European/Ramsar Sites[19], in which they state that in relation to noise disturbance of birds:

Studies generally show that birds are disturbed by a sudden large noise but have the ability to habituate (become accustomed to) to regular noises. For instance, with respect to piling specifically, it has been concluded that although piling has the potential to create most noise during construction, it often consists of rhythmic "bangs", which, after a short period, birds are likely to become accustomed to (ABP Research, 2001).

and:

As part of the construction work for ABB Power Generation Ltd (Pyewipe), winter bird monitoring showed that there was no large-scale disturbance due to construction work on the site. Although some localised disturbance was recorded in response to two sudden events, this was not considered to have a major effect on surrounding bird populations and was found to be no greater than the effect arising from third party disturbance, including walkers and stopped cyclists, which were unrelated to the work carried out by ABB (ERM, 1996). Observations suggested that it was the initial sudden bang during piling activities, which caused the disturbance, and that subsequent bangs typically resulted in reduced disturbance, demonstrating habituation.

These findings were supported by the studies carried out for the Humber International Terminal development, which again indicated that the key factor in triggering disturbance was human presence (ABP Research, 2000). Over 12 separate visits, disturbance by construction activities (which involved piling and reclamation of part of the foreshore) was observed on 3 occasions and in each case birds were disturbed over a small area and then rapidly resettled within the zone of disturbance (i.e. they did not leave the area). More recently, surveys of the birds around the Immingham Outer Harbour in the Humber (using the same methods) have also indicated that such disturbance events are limited and are often attributable to non-Port related activities such as the presence of Peregrine Falcons or walkers on the mudflat (ABPmer, 2010e).

The ABP Teignmouth Quay Development estimated an approximate zone within which birds may be affected by disturbance from construction works (piling and dredging) to be typically about 200m (ABPmer, 2002). The startling effects of sudden noise were quantified, based on published research, by the Environment Agency for the Humber Estuary Tidal Defences scheme. It was concluded that a sudden noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this of approximately 70dB causing flight or anxiety behaviour in some species.

7.2.27 Following discussion with the geotechnical advisors and contractor advisors for the project it has been confirmed that blasting will not be required. Should further information come to light as the proposed scheme design is finalised which demonstrates a need for blasting, there will

[19] http://www.gov.scot/Publications/2011/03/04165857/15 accessed 23/03/2017

be a limitation placed on the timing of the activity to exclude the period between October and March when the birds are present. Such a restriction eliminates the potential for adverse impact from this source.

7.2.28 There will also be a requirement under the contract that should it be the intention to undertake breaking out of rock at Bready and piling at the Burn Dennet within the period when the birds are present, trial breaking out and piling must be undertaken with monitoring by an appropriately qualified Ornithological Clerk of Works.

7.2.29 The trials will involve short periods of breaking out and piling at prescribed intervals to establish if the activity results in disturbance which could prove detrimental should the more prolonged periods of the activities which will be required to complete the cutting and bridge abutments be progressed. If the trials indicate this will be likely to the case, the activities will be suspended while Whooper swan or Greylag geese are within 300m of the noise source. The following factors will be considered to be probative of detrimental disturbance.

- Physical displacement of birds (flight from source) with non-return within 5 minutes;
- Reduction in foraging activity due to increase in scanning times.

7.2.30 Should either of these responses be noted, works will be suspended as above.

7.2.31 In consequence, and subject to the mitigation strategies outlined above, construction disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the Ramsar sites, or the integrity of the sites.

Operational disturbance

7.2.32 The operation of the proposed scheme also has potential to cause disturbance to bird species, with the noise generated from increased traffic volume and speeds potentially causing the displacement of Whooper swan through increased disturbance. However, behavioural impacts such as disturbance from feeding grounds as a result of construction or operation phases are always context-dependant, with responses to disturbance depending upon the trade-offs experienced by individual birds (Gill, 2007). For example, the decision to stay or to leave an area in response to disturbance will be influenced by the quality of the area, availability and relative quality of alternative areas, and relative predation risk on current and alternative sites among others (Gill, 2007). Habituation, that is 'the relatively persistent waning of a response as a result of repeated stimulation which is not followed by any kind of reinforcement' (Hinde, 1970), has been demonstrated in the short-term in some studies on disturbance to Whooper swan, however an increased tolerance did not appear to be maintained over longer periods with the behavioural patterns on a day to day basis providing additional support to this (Rees et al., 2005).

7.2.33 While the closest approach of the mainline to a field with recorded Whooper swan use is around 150m, which is at the limit of the distance recorded for tractor disturbance of Whooper swan (Rees *et al*, 2005), the study was in relation to disturbance ‘events’ rather than exposure to constant stimuli. Whooper swan have been shown to quickly habituate to continuous traffic

movements, for example at the Toome Bypass (Hill. M, 2014, *Pers. Comm*). Therefore, operational disturbance is unlikely to have a significant effect.

7.2.34 To determine the potential for disturbance of Greylag geese it is important to understand the distances over which they will be disturbed. Keller (1989) identified Greylag geese avoid roads in agricultural land in Scotland, with avoidance behaviour recorded for distances of 100m from roads. The closest recorded Greylag geese in any of the studies undertaken was over 500m, thus operational disturbance is unlikely to occur.

7.2.35 Operational disturbance impacts are therefore considered to be not significant in relation to the conservation objectives for the Ramsar sites, or the integrity of the sites.

7.3 Atlantic salmon and sea lamprey

7.3.1 The introduction of the proposed scheme into the existing mosaic of terrestrial and aquatic habitats within the River Foyle Catchment has the potential to affect Atlantic salmon and sea lamprey as a reason for selection of the Lough Foyle Ramsar Site where they are present within the Foyle catchment.

7.3.2 Potential impacts associated with the construction and future presence of the proposed scheme and its associated traffic which have been identified comprise:

- disturbance or harm associated with construction related noise, vibration and lighting within the wider catchments;
- disturbance or harm associated with the construction of bridges, culverts, watercourse diversions and drainage outfalls and other locations where working areas including site compounds will be within 50m of watercourses in the wider catchments;
- loss of habitat relied on by the species within the wider catchments;
- fragmentation as a result of obstruction or prevention of passage for the species along watercourses in the wider catchments once the proposed scheme is open to use;
- harm to the population of the species associated with the Ramsar sites as a result of increased concentrations of TSS and other harmful substances in watercourses associated with discharges from drainage outfalls for the proposed scheme; and
- disturbance during use as a result of road related lighting.

Construction related noise, vibration and lighting

Noise and vibration

7.3.3 Atlantic salmon are capable of detecting the pressure and particle motion components of sound; levels of anthropogenic noise and vibration may exceed the hearing threshold of Atlantic salmon (Hawkins and Johnstone, 1978). This is due to their physiological makeup and the particle composition of water and soil, which facilitate propagation further than in air

(Popper, 2008). The resulting potential impacts can be hearing impairment (Nedwell et al., 2005) or death, either directly from the noise generation or indirectly as a result of hearing impairment. Construction activities associated with the proposed scheme likely to pose such a risk are blasting or piling particularly within watercourses.

7.3.4 The proposals do not require blasting or piling within watercourses. The establishment of abutment foundations at the proposed River Mourne and Rive Derg crossings will, however, involve piling close to the top of the bankside slopes at both watercourses. In light of this, discussions have been held with Loughs Agency and appropriate mitigation measures have been identified and agreed.

7.3.5 The draft CEMP includes identification of working windows for watercourses with salmonid interest. A working window of May to September has been agreed with Loughs Agency for the Derg crossing, which represents a period outside of the critical salmonid spawning and incubation periods. However as downstream smolt run can occur from April to the end of May, a precautionary approach will be undertaken and the final agreed working date commencement will occur following consultation and up to date monitoring of the watercourses.

7.3.6 In the case of the River Mourne crossing the contractors will be required to utilise Continuous Flight Auger (CFA) piles. In the case of the foundations for the abutment walls at other bridges either CFA or drilled piles will be used. Therefore all piles will be rotary bored piles which do not produce significant vibration.

7.3.7 Mitigation to be incorporated in the construction procedure for all piling within 50m of a watercourse will include a soft -start methodology. The soft-start methodology will involve a gradual increase in force and intensity of percussive piling or drilling, and hence, noise and vibration, over a 30 minute period to allow Atlantic salmon to move outside of the area of influence. The soft-start methodology would be required each time the machinery is started following a 30 minute rest period. Once the piling is in full operation, associated noise and vibration from the machinery will keep fish outside of the area of influence. This process will need to be repeated at the start of each day, as overnight working is not proposed for construction works in close proximity to watercourses.

Lighting

7.3.8 Artificial lighting at night has the potential to disrupt and disorientate fish, increase exposure to predation, alter light-sensitive endocrine systems and disrupt crepuscular and nocturnal mating, signalling and dispersal (Rich and Longcore, 2006). With regards to Atlantic salmon, the main impacts resulting from artificial lighting are disruption to migration behaviour (Thorpe et al., 1988; Nemeth and Anderson, 1992) and increased mortality rates due to increased efficiency of predators (Tabor et al., 2004; Kemp and Williams, 2009).

7.3.9 Night working in the vicinity of watercourses identified as being of salmonid interest will not generally be allowed. However, circumstances may arise which require emergency works outside of daylight hours, in these cases lighting will be positioned/cowled to minimise light spill onto the watercourse and the duration will be kept to a minimum. These approaches will

be contractual commitments placed on contractors by DfI, which will be audited as part of DfI standard practice.

Disturbance or harm associated with construction

Release of sediment or other construction related pollutants into watercourses

7.3.10 Construction related to earthworks and structures can involve in the release of sediments and other construction related pollutants into watercourses. In the context of the proposed scheme this could result in loss of spawning and nursery habitat used by Atlantic salmon and direct harm to the species as a result of concentrations of sediments and other pollutants in the water.

7.3.11 In the wider catchments the risk will occur where:

- localised in-stream works and works on the bankside of watercourses will be required for the construction of temporary and permanent bridges, culverts, watercourse diversions and headwalls for drainage outfalls;
- construction of earthworks to establish the vertical alignment for the proposed scheme is located within 50m of the watercourses;
- construction of filter drains, ditches, swales, grassed channels and wet and dry ponds is required to attenuate and carry road related run-off to drainage outfalls;
- site compounds and materials storage areas are located close to watercourses.

7.3.12 The installation of rip-rap to protect bridge abutments will require the placing of rock-filled gabion mattresses on the profiled and consolidated banks at the base of bridge abutments. The design of the gabion mattresses will take into consideration both the water quality and the speed or energy of the watercourse. Both of these factors will be used to inform on the gauge and corrosion characteristics of the gabion mesh. It is recognised that where there is a potential risk of impact from river debris it is recommended that a heavier mesh face material is used. Furthermore, to ensure that the integrity of the rock-filled gabion mattresses is maintained throughout its design life, a regime of inspections in accordance with BD63/07[20] will be implemented. Measures and requirements detailed in Annex 2.4 of the draft CEMP in Appendix 5 of this report will be adhered to minimise potential sediment release into watercourses to negligible levels. Contractors will also be required to ensure imported rock does not contain invasive species of plant.

7.3.13 The temporary bridges over the Burn Dennet, Glenmornan, River Derg and Fairy Water will be clear span temporary bridge structures that will be installed at a level which allows for flood

[20] DMRB Volume 3 Section 1 Part 4 Inspection of Highway Structures

water to pass underneath, and does not block movement of animals along the watercourse corridor.

7.3.14 The installation of culverts and watercourse diversions will result in disturbance to watercourse channels and banksides and could result in consequent release of sediments into the watercourses. The proposed method of construction whereby culverts on diverted sections of watercourse will be completed prior to abandonment of the relevant section of existing channel, and temporary sections of diverted watercourse will be provided along watercourses where culverts are to be constructed on-line, will substantially limit potential release of sediments into waters of salmonid presence or potential.

7.3.15 As illustrated in Figure 10 headwalls will generally be of concrete construction. The area which will be subject to disturbance and the volumes of soils which will require to be excavated will be small. Excavated soils will be temporarily set aside a minimum of 3m from the top of the bankside and any not required for reinstatement of the bankside will be removed from site once reinstatement of the bankside profile is completed. The activity is one which will be of short duration.

7.3.16 The risk will be greater where outfalls are required on smaller tributaries and headwaters with relatively low volumes of flow. In these locations the works will be programmed for implementation at times of lowest flow between May and September.

7.3.17 Spillage of fuels and oils associated with machinery required for earthworks and installation of the structures could result in release of hydrocarbons in all of the above locations. The presence of cement in storage prior to use and release of such contaminants into watercourses as structures are built could result in mortality or harm where the watercourses are used by Atlantic salmon.

7.3.18 The Water Framework Directive identifies a requirement for suspended solids levels to be kept below 25mg/l for fish species to thrive. However, Loughs Agency have raised concerns that the risks associated with sediments relative to Atlantic salmon will be greater during construction rather than during use of the proposed scheme upon completion of construction. The Agency's concern particularly relates to the proximity of work activities where sediments will be generated and potentially released into parts of the watercourses where there is spawning and nursery habitat and has stipulated a requirement for a more stringent standard during construction above background levels in such locations.

7.3.19 Mitigation measures have accordingly been discussed with Loughs Agency which are focused on the achievement of both thresholds in accordance with the status of the watercourses as ones used for fish passage and ones where salmonid nursery and spawning habitat is present. The measures have been formalised in Section 2 of the draft SMP provided in Appendix 6 and will be a mandatory requirement of the contract-specific SMPs which contractors will be required to prepare agree with DfI and Loughs Agency prior to the commencement of works.

Loss of supporting habitat

7.3.20 Where bridges, culverts, watercourse diversions and headwalls for drainage outfalls are proposed there will be a permanent loss of habitats other than primary and qualifying habitats which are relied on by Atlantic salmon. These include marginal habitats with overhanging vegetation and reduced flows which are important for fish migration as they provide areas of cover under which to rest. They also provide protection from predators and direct sunlight.

Open span bridges

7.3.21 The proposed open span bridges will involve the permanent loss of the bankside vegetation beneath the open span structures. The loss will include grassy banks, scrub and overhanging trees. In the context of each of the watercourses crossed, the length and scale of the watercourses and extent of salmonid habitat associated with each watercourse, the loss will be negligible. To ensure that in stream vegetation habitat loss is minimised pre-planted coir rolls of suitable native emergent and marginal vegetation will be inserted into the rip-rap during construction. In addition, suitable bankside planting will be undertaken where possible. Where open span bridges are installed at major watercourse crossings, there may be an impact from the shade cast by the bridge on in-stream habitats. This shade could reduce the ability of the habitats to thrive, and could result in a minor reduction in primary production within the watercourse.

Culverts

7.3.22 The proposed culverts will involve the permanent loss of supporting habitats where the culverts are aligned beneath the proposed dual carriageway and its supporting earthworks. The surveys undertaken during 2012 and 2013 by WSP and Loughs Agency have established that a total of 70 culverts will be located on watercourses classified as being of salmonid potential. In line with the precautionary approach adopted during the preparation of this initial information, these are currently assumed to be of importance to Atlantic salmon and will comprise box culverts as described in Table A2.1.

7.3.23 The proposed culverts vary in length from 25m to 110m. Most do not exceed 60m. The total length of culvert, and hence the length over which bankside, marginal and in-stream habitat will be permanently lost is some 3.4km. 14 salmonid watercourses have more than one culvert proposed, with 12 of these requiring 2 culverts and 2 requiring 3 culverts.

7.3.24 There will be a permanent loss of some 6.8km of marginal and bankside habitat[21] in the context of in excess of 300km of watercourse where salmonid presence / potential has been established.

7.3.25 Proposed mitigation provides for the introduction of bankside planting reflecting that which will be lost within the vested land upstream and downstream of each culvert which will in some

[21] Taking the precautionary approach that both banks have suitable habitat for the length lost, i.e.3.4km x 2

instances enhance the tree, scrub and grassland habitats as sources of food and shade at resting places.

7.3.26 Initial loss of in-stream habitat, primarily comprising gravels and boulders, will be largely mitigated as a result of the proposals relating to the embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures.

Watercourse diversions

7.3.27 The 56 proposed watercourse diversions of watercourses with salmonid interest will involve the permanent loss of supporting habitats along some 10km of existing sections of watercourse which will be abandoned. The lost habitat will, however, be re-established as part of the construction of the new sections.

7.3.28 This will involve the replication of bed and channel characteristics of the watercourses and planting of marginal and bankside habitat which will reinstate the ecological characteristics of the original watercourse along the diversions on which they are located. It will also be a specific requirement of the contracts that construction of the new sections must be completed prior to the closure and abandonment of the diverted section. The de-watering of the abandoned sections will be carried out under supervision of an ecological clerk of works to ensure fish which may be present, including salmon, are safely removed.

Habitat Fragmentation

7.3.29 The introduction of bridges and culverts along watercourses associated with the Ramsar sites and used by Atlantic salmon could potentially obstruct or discourage passage of the fish as they seek to return to spawning areas and migrate to sea. The following design and mitigation measures which include advice detailed in River Crossings and Migratory Fish: Design Guidance' (Scottish Executive 2000) have accordingly been incorporated into the proposals:

- provision of oversized box culverts along watercourses identified as being of importance to salmonids;
- diversion of watercourses to facilitate the introduction of a shorter culvert, with lower flow velocity downstream and better light penetration, at or close to right angles to the proposed scheme carriageways where the angle of crossing would otherwise be overly long or steep;
- avoidance of steps in the vertical profile through culverts and along associated diverted watercourses;
- avoidance of bends in culverts which could initiate the deposition of debris and obstruct passage;
- adoption of vertical profiles through the culverts relative to length in accordance with Table 5.1 of the guidance;

- provision of resting areas upstream and downstream of the culverts.

7.3.30 The proposals recognise that during periods of low flow many of the smaller watercourses which feed into the main rivers and principal tributaries and in the upper parts of the catchment have little depth of water. The design proposals described in 5.3.3 and 5.3.4 which require embedding of culvert bases, introduction of gravels and boulders, provision for natural sedimentation and location of boulders upstream and downstream of the structures, make specific provision for these locations but will also be required wherever box culverts are proposed in light of salmonid presence / potential.

Road related lighting

7.3.31 All new lighting will involve the use of full spill cut-off luminaires which will contain the extent of spill within the dual carriageway footprint. Luminaires on the existing Mourne River bridge and associated with the existing A38 approach and bridge linking the existing A5 and Lifford will also be replaced with full spill cut-off units such that the extent of spill associated with the existing bridge will be reduced. This combination of proposals will result in a slight improvement relative to light and the passage of salmon in this location.

7.4 In-Combination Effects

7.4.1 The Habitats Directive, NI Regulations and ROI Regulations require consideration to be given to potentially combined effects of a development project and other projects on Natura 2000 sites. Two proposed development projects, which have either been approved in outline or fully approved in accordance with the relevant development consent regime for the form of development proposed, have been considered to date in the context of this requirement for the currently proposed A5WTC:

- N14/N15 Lifford Link Road; and
- Three Rivers mixed use development at Strabane.

7.4.2 The focus of the Lifford Link Road scheme is a viaduct crossing from Tyrone to Donegal between J7 on the proposed A5WTC and a new junction on the N15 in Donegal south west of Lifford. The design of the viaduct provides for a clear span over the River Finn and its banks which is designated as the River Finn SAC and River Foyle and Tributaries SAC either side of the national border which is located mid-stream. An Environmental Impact Statement as required by the ROI Regulations has been completed (The N14 / N15 to A5 Link, Environmental Impact Statement/Environmental Statement Non-Technical Summary 2011), as has a Natura Impact Statement (NIS) reporting the findings of the appropriate assessment. The EIS/ES and NIS conclude that based on the design and proposed mitigation measures relating to pollution control the proposed scheme will have no impact on otter and Atlantic salmon as species cited as a primary reason for selection of the designated river, and no adverse effect on the integrity of the Ramsar Sitess.

7.4.3 The Three Rivers development proposal lies within the floodplain of the River Foyle at Strabane. Proposals for the mixed use leisure and employment project include re-alignment

of the flood defences and culverting of a section of a minor watercourse. The A5WTC does not involve work relative to these areas associated with the river and River Foyle and Tributaries SAC either directly or indirectly, though it does involve the introduction of the proposed open span bridge over the River Mourne, a proposal which is close to but independent to the proposed leisure and employment development. The assessments undertaken relative to the proposed Mourne Bridge have demonstrated, that with the adoption of an open span structure and inclusion of pollution control and noise mitigation measures as part of the contracts for the works, the implementation of the proposed bridge will not have a significant effect on habitats or species of primary or qualifying importance to the SAC. The proposed scheme will accordingly not have any in combination effects with the 3 Rivers development proposal relative to the Ramsar sites.

7.4.4 There are no other reasonably foreseeable projects that would interact with the A5WTC at this stage.

7.5 Adaptive Monitoring

7.5.1 As discussed above (4.2.19), the effectiveness of the mitigation measures delivered through the CEMP and the SMP will be monitored via an adaptive monitoring plan, in which conservative threshold targets will be set and intensely monitored over the construction period. The two target levels (Investigation and Action) will be agreed with NIEA and Loughs Agency, which will identify criteria against which monitoring would be undertaken both during construction and over an agreed period post construction. Climate change forecasts will be reviewed, consistent with any updates by the UK Climate Change Panel. Appropriate remedial measures would be put in place as required in relation to the findings of the monitoring so as to achieve the objectives of the proposed measures.

8 Summary

8.1.1 The Lough Foyle Ramsar Site and Lough Neagh & Lough Beg Ramsar Site have been identified as sites with a relationship to the proposed A5WTC which requires that they should be considered in the context of the EC Birds Directive, as transposed by the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 in Northern Ireland and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland as amended by European Communities (Natural Habitats) (Amendment) Regulations, 2005.

8.1.2 Both Ramsar Sites have been subject to a process of screening based on the EU guidance and using the template provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. In both instances and through the parallel HRA process it has been concluded:

- the proposed scheme is a project which is not connected with or necessary to the management of the Ramsar sites;
- the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
- that Stage 2 Appropriate Assessments should be undertaken.

8.1.3 Following the Stage 2 Appropriate Assessment it is concluded:

- The A5WTC has been designed to avoid features related to Natura 2000 sites as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design;
- An adaptive monitoring programme will be put in place both during construction phase and over an agreed period post construction; which will consider the implication of any update in climate change forecasts;
- Any increase in the size of core foraging areas outwith the SPA as a consequence of wetter winters due to climate change can be managed through monitoring (a watching brief) by a qualified ornithologist over the construction period; and
- Based on the best scientific knowledge available, there will not be a significant effect on the conservation objectives of the Ramsar sites.

8.1.4 The information provided in this report indicates the proposed scheme will not have an impact on the integrity or the conservation objectives of the Ramsar sites either independently or in combination with other projects.

9 References

Alabaster, J.S. and Lloyd, R. (1982) Water quality criteria for freshwater fish. Butterworths, 297pp.

BirdLife International (2010) IUCN Red list for birds. Downloaded from http://www.birdlife.org on 20/12/2010.

BirdLife International (2010) Species factsheet: Anser anser. Downloaded from http://www.birdlife.org on 22/12/2010.

Bruton, M. N. (1985) The effects of suspensoids on fish. Hydrobiologia 125 pp 221 – 241.

Burger, J. & Gochfeld, M. (1981). Discrimination of the threat of direct versus tangential approach to the nest by incubating herring and great blackbacked gulls. Journal of Comparative Psychology, 95, 676–684

Chapman, D. W. (1988) Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117 pp 1 – 21.

Colhoun, K. (2001). The Irish Wetland Bird Survey 1998 – 99: results from the fifth winter of the Irish Wetland Bird Survey. BWI/NPW/WWT,Dublin.

Crabtree, B., Dempsey, P., Moy, F., Brown, C., and Song, M. (2007b) Improved determination of pollutants in highway runoff phase 2 stage 3 report. WRc Report UC7309.

Crisp, D. T. (1996) Environmental requirements of common riverine European salmonids fish species in fresh water with particular reference to physical and chemical aspects. Hydrobiologia 323, pp 201-221.

Crowe, O., McElwaine, J.G., Worden, J., Watson, G.A., Walsh, A., & Boland, H. (2005). Whooper Cygnus cygnus and Bewick's C.columbianus bewickii Swans in Ireland: results of the International Swan Census, January 2005. Irish Birds 7 (2005).

Department of Finance and Personnel (2006) A Sustainable Development Strategy for NI – first steps towards sustainability. The document can be found at: http://www.ofmdfmni.gov.uk/sustain-develop.pdf

Design Manual for Roads and Bridges (2008a) Volume 11 Section 2, Part 1– HA 201/08 Environmental Impact Assessment.

Design Manual for Roads and Bridges (2008b) Volume 11 Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects.

Design Manual for Roads and Bridges (DMRB) Standard HD 44/09. Assessment of implications (of Highways and/or Roads projects) on European sites (including appropriate assessment). Volume 11, Section 4. Full text found at: http://www.standardsforhighways.co.uk/dmrb/index.htm

Draulans D. & Van Vessem J. (1985) The effect of disturbance on nocturnal abundance and behaviour of grey herons (*Ardea cinerea*) at a fish-farm in winter. *Journal of Applied Ecology*, 22, 19-27

Durell, S.E.A.L., Stillman, R.A., Triplet, P., Aulert, C., Biot, D.O.D., Bouchet, A., Duhamel, S., Mayot, S. & Goss-Custard, J.D. (2005) Modelling the efficacy of proposed mitigation areas for shorebirds: a case study on the Seine estuary, France. *Biological Conservation*, 123, 67–77.

European Commission (2000) Managing Natura 2000 Sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

European Communities (Natural Habitats) (Amendment) Regulations, 2005.

European Council (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

European Court of Justice (2004) Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Case C-127/02. European Court reports 2004

Forman, R.T.T & Alexander, L.E. (1998) Roads and their Major Ecological Effects. Annu. Rev. Ecol. Syst. 29 207-31.

Gill, J. A. (2007). Approaches to measuring the effects of human disturbance on birds. Ibis 149 (Suppl. 1) pp 9 – 14.

Hawkins, A. D. and Johnstone, A. D. F. (1978) The hearing of the Atlantic salmon *Salmo salar*. Journal of Fish Biology 13 (6) pp 655 – 749.

Hawkins, A. D. and Smith, G. W. (1986) Radio tracking observations of Atlantic salmon (Salmo salar L.) ascending the Aberdeenshire Dee. Scottish Fisheries Research Report 36 (24).

Hearn, R.D. & Mitchell, C.R. (2004). Greylag Goose Anser anser (Iceland population) in Britain and Ireland 1960/61 – 1999/2000. Waterbird Review Series, The Wildfowl and Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

Hellawell, J. M, Leatham, H. and Williams, G. I. (1974) The upstream migratory behaviour of salmonids in the River Frome, Dorset. Journal of Fish Biology 6, pp 729-744.

Hendry, K. and Cragg-Hine, D. (2003) Ecology of the Atlantic Salmon. Conserving Natura 2000 Rivers Ecology Series No. 7. English Nature, Peterborough.

HMSO (1995) The Conservation (Natural Habitats, &c.) Regulations (Northern Ireland) 1995.

Joint Agencies. Department of Food Environment and Rural Affairs (DEFRA), Department of Environment and Climate Change (DECC), Met Office, Environment Agency (EA) 2016. Is UKCP09 still an appropriate tool for adaptation planning? Land Projections April 2016

Keller V.E. (1989) The effect of disturbance from roads on the distribution of feeding sites of geese (Anser brachyrhynchus, A. anser), wintering in north-east Scotland. Ardea. 79, 229-232.

Kemp, P. S. and Williams, J. G. (2009) Illumination influences the ability of migrating juvenile salmonids to pass a submerged experimental weir. Ecology of Freshwater Fish 18 pp 297 – 304.

Kirby, J.S., Clee, C. & Seager, V. 1993. Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary results. Wader Study Group Bull. 68: 53-58.

Loughs Agency (2009) River and Tributaries Status Reports 2009. Accessed through www.loughs-agency.org on 15th December 2010

McElwaine, G. & Spouncer, C. (2006). A6 Road Improvements- Toome to Castledawson: Whooper Swan (Cygnus cygnus) Survey 2005/2006 and Impact Assessment.

Moser, M.L. and Mesa, M.G. (2009) Passage Considerations for Anadromous Lampreys. American Fisheries Society Symposium 72:000–000, 2009

Mouchel (2010) A5 Western Transport Corridor Environmental Statement Volumes 1 to 3. Document Ref 718736-3000-R-008

Mullarney, K., Svensson, L., Zetterström, D. and Grant, P. J. (1999) Bird Guide. HarperCollins Publishers, London.

Murphy, J.M., Sexton, D.M.H., Jenkins, G.J., Boorman, P.M., Booth, B.B.B.,Brown, C.C., Clark, R.T., Collins, M., Harris, G.R., Kendon, E.J., Betts, R.A.,Brown, S.J., Howard, T. P., Humphrey, K. A., McCarthy, M. P., McDonald, R. E.,Stephens, A., Wallace, C., Warren, R., Wilby, R., Wood, R. A. (2009), UK Climate Projections Science Report: Climate change projections. Met Office Hadley Centre, Exeter.

Nedwell, J. R., Lovell, J. M. and Turnpenny, A. W. H. (2005) Experimental validation of a species-specific behavioural impact metric for underwater noise. Proceedings of the 50th Meeting of the Acoustical Society of America/NOISE-CON 2005, 17-21 October 2005, Minneapolis, Minnesota.

Nemeth, R. S. and Anderson, J. J. (1992) Response of Juvenile Coho and Chinook Salmon to Strobe and Mercury Vapour Lights. North American Journal of Fisheries Management 12 pp 684 – 692.

NI Biodiversity Group (2002) NI Biodiversity Strategy. Environment and Heritage Service, Belfast.

NI Biodiversity Action Plan (NIBAP) (2005) Full texts for all habitats referred to available at: http://www.ni-environment.gov.uk/biodiversity/hap_uk/hap_ni.htm

Office of the Attorney General (ROI) (1997) S.I. No. 94/1997 European Communities (Natural Habitats) Regulations 1997 (as amended).

Pfister, C., Harrington, B.A. & Lavine, M. (1992) The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation, 60, 115–126.

Popper, A. N. (2008) Effects of Mid- and High-Frequency Sonars on Fish. Contract N66604-07M-6056, Naval Undersea Warfare Centre Division, Newport, Rhode Island.

Rees, E.C., Bruce, J.H. 7 White, G.T. (2005). Factors affecting the behavioural responses of Whooper swans (Cygnus c. cygnus) to various human activities. Biological Conservation, 121 (pgs 369-382).

Reijnen, R. Foppen, R. ter Braak, C. and Thissen, J. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32 pp187-202.

Reijnen R, Foppen R, Meeuwsen H. 1996; The effects of traffic on the density of breeding birds in Dutch agricultural grasslands. Biological Conservation 75 255-260.

Rich, C. And Longcore, T. (eds) (2006) Ecological Consequences of Artificial Night Lighting. Island Press, Washington DC, USA.

Robinson, J.A., Colhoun, K., McElwaine, J.G. & Rees, E.C. (2004). Whooper Swan Cygnus cygnus (Iceland population) in Britain and Ireland 1960/61 – 1999/2000. Waterbird Review Series, The Wildfowl and Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

Ryan, P. A. (1991) Environmental effects of sediment on New Zealand streams: A review. New Zealand Journal of Marine and Freshwater Research 25 pp 207 – 221.

Scottish Executive (2000) River Crossings and Migratory Fish: Design Guidance. Accessed through http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp on 7th November 2008.

Stillman, R. A., Goss-Custard, J. D., West, A.. D., Dit Durell, S. E. A. le V., Caldow, R. W. G., McGrorty, S. & Clarke, R. T. (2000). Predicting mortality in novel environments: tests and sensitivity of a behaviour-based model. Journal of Applied Ecology, **37**, 564-588.

Skinner, A., Young, M. and Hastie, L. (2003) Ecology of the Freshwater Pearl Mussel. English Nature, Peterborough, UK.

Suttle, K. B., Power, M. E., Levine, J. M. and McNeely, C. (2004) How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. Ecological Applications 14 (4) pp 969 – 974.

Sutherland, W.J. & Crockford, N.J. (1993) Factors affecting the feeding distribution of red-breasted geese Branta ruficollis wintering in Romania. Biological Conservation, 63, 61–65

Sutherland, W.J. (1998). The importance of behavioural studies in conservation biology. *Animal Behaviour,* 56, 801-809.

Tabor, R. A., Brown, G. S. and Luiting, V. T. (2004) The effect of light intensity on sockeye salmon fry migratory behaviour and predation by cottids in the Cedar River, Washington. North American Journal of Fisheries Management 24 pp 128 – 145.

Thorpe, J. E., Morgan, R. I. G., Pretswell, D. and Higgens, P. (1988) Movement rhythms in juvenile Atlantic salmon, *Salmo salar* L. Journal of Fish Biology 33 pp 931 – 940.

Tuite, C.H., Hanson, P.R. & Owen, M. (1984) Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales, and the influence of water-based recreation. *Journal of Applied Ecology*, 21, 41–62.

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Appendices

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Appendix 1: Sheets 1 to 24

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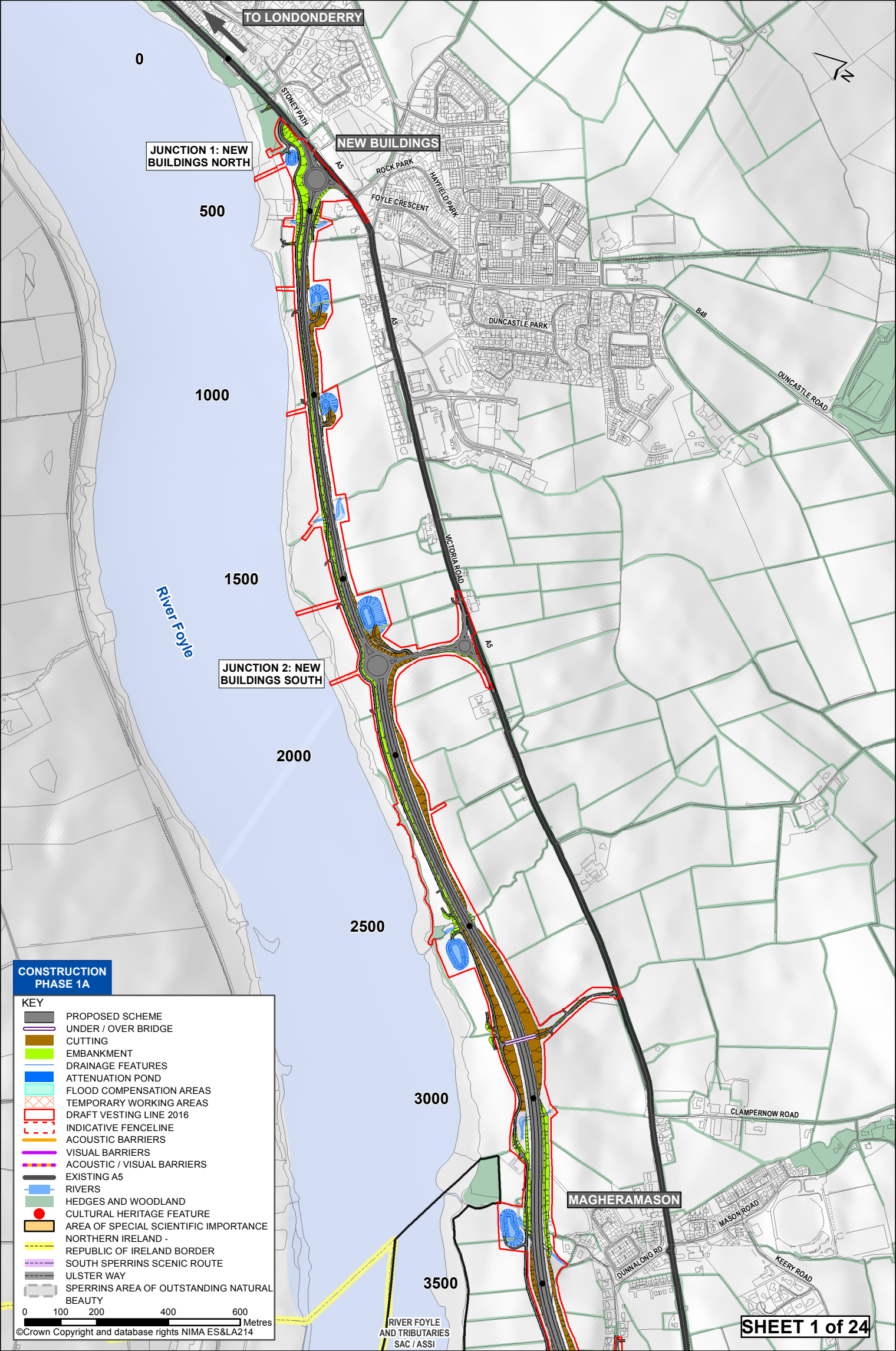
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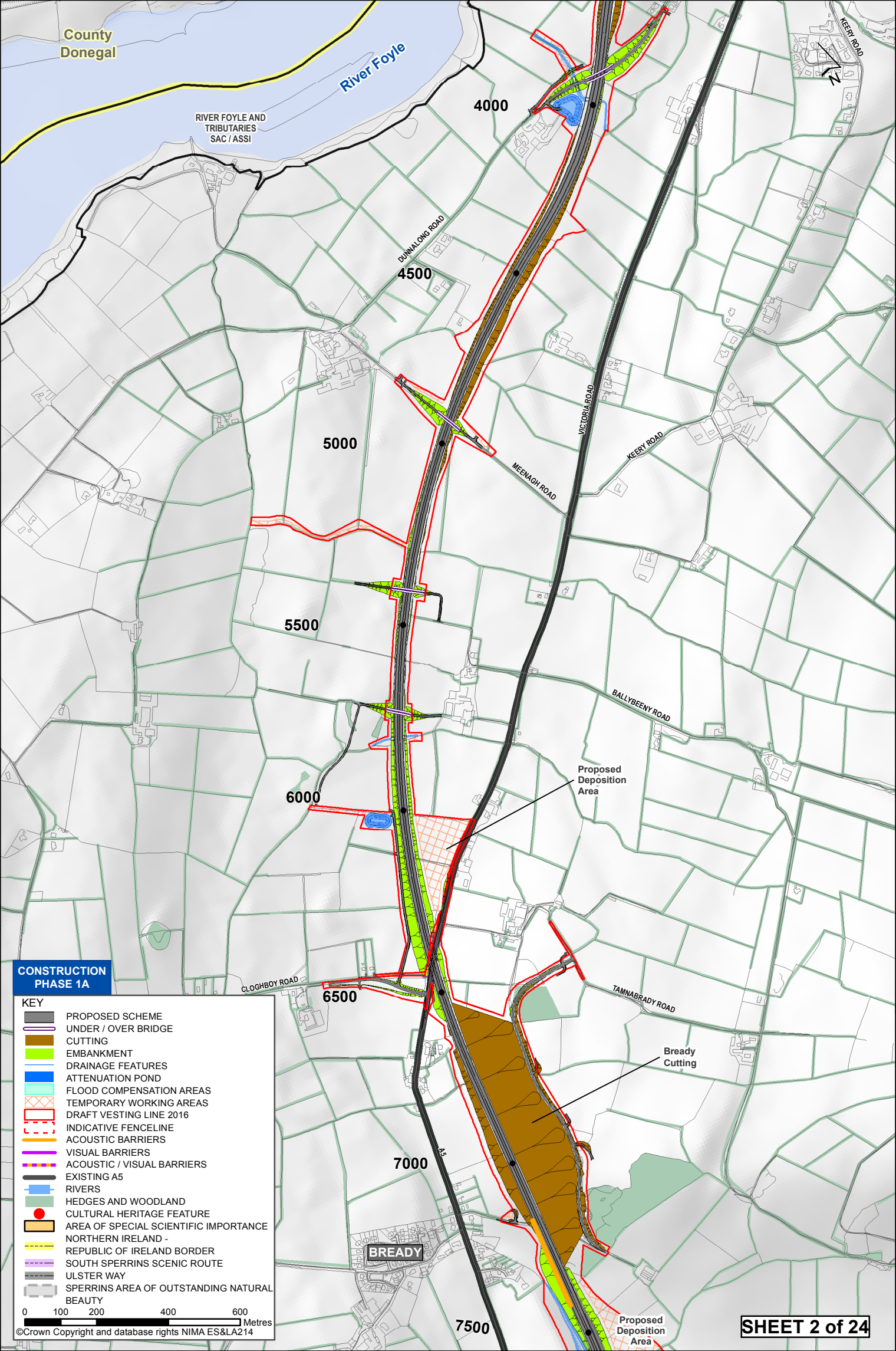
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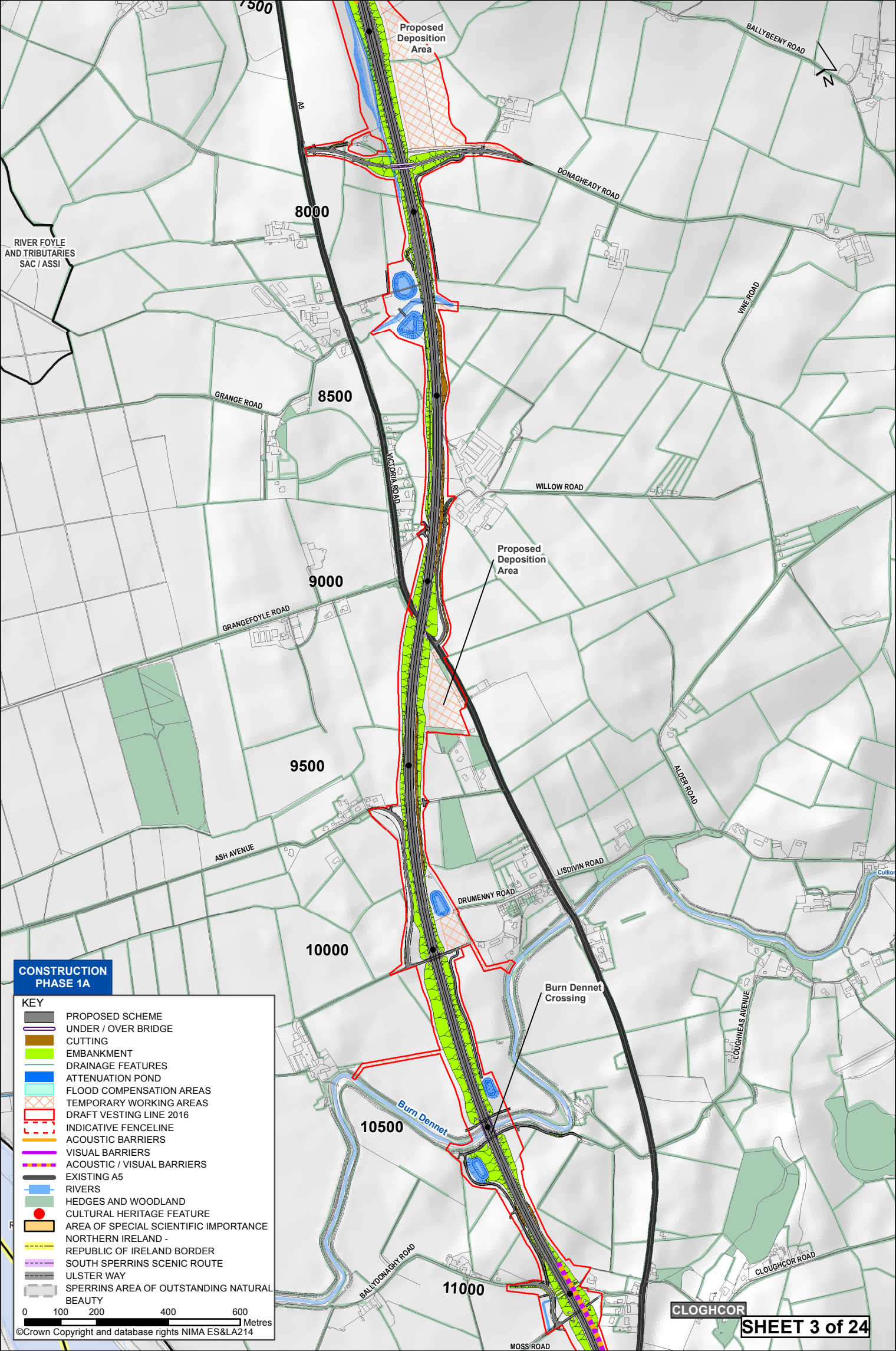
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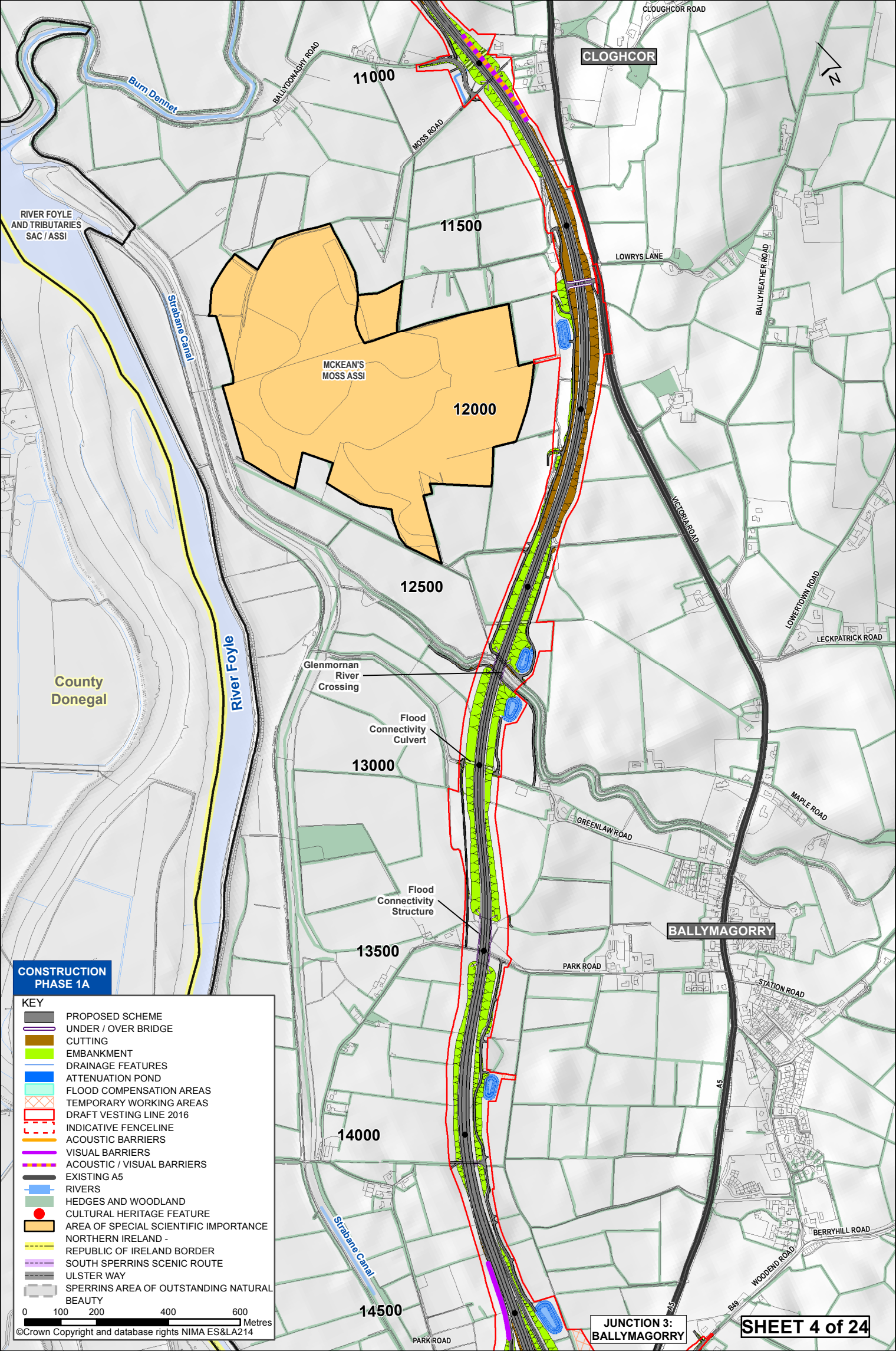

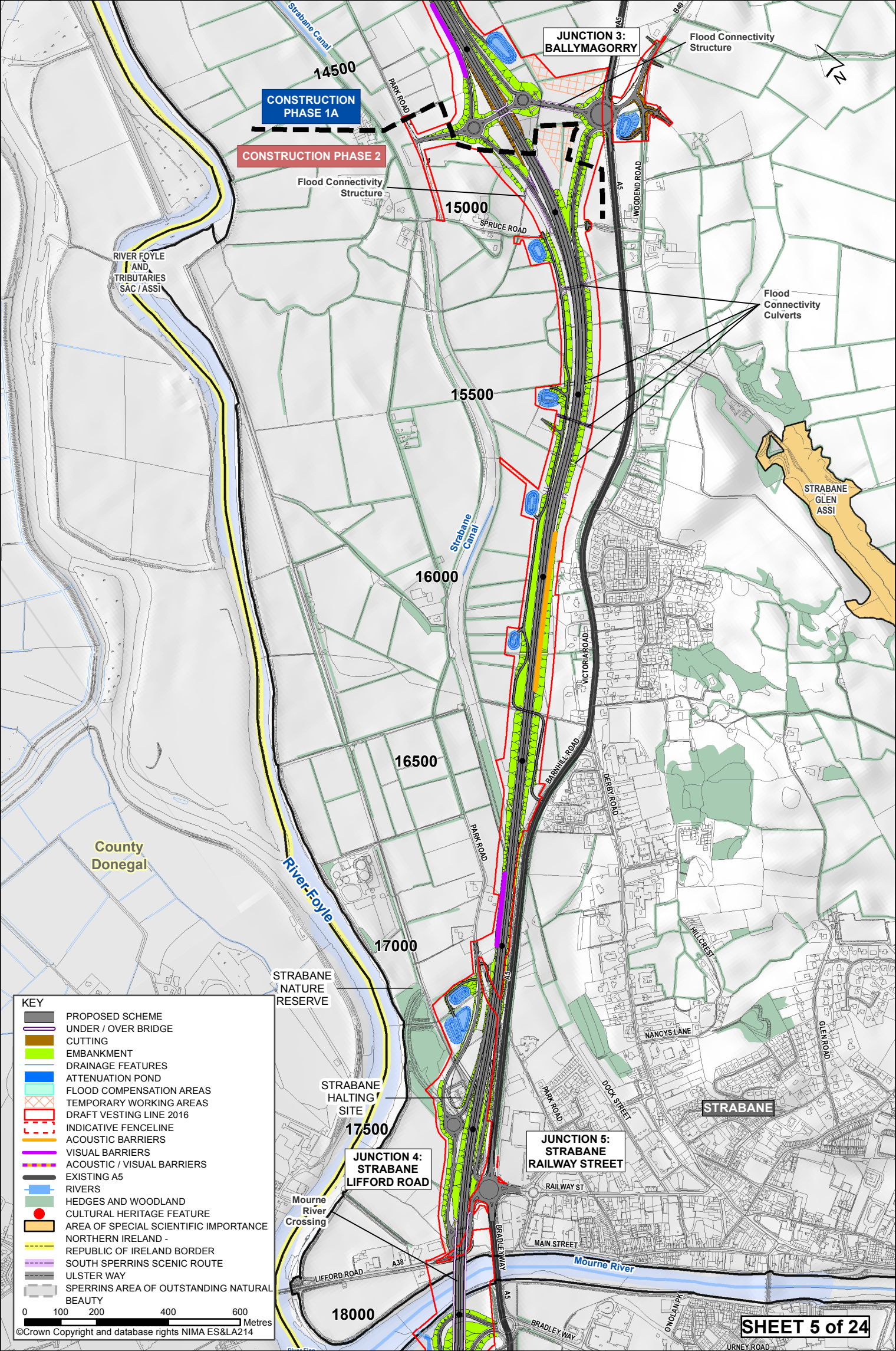
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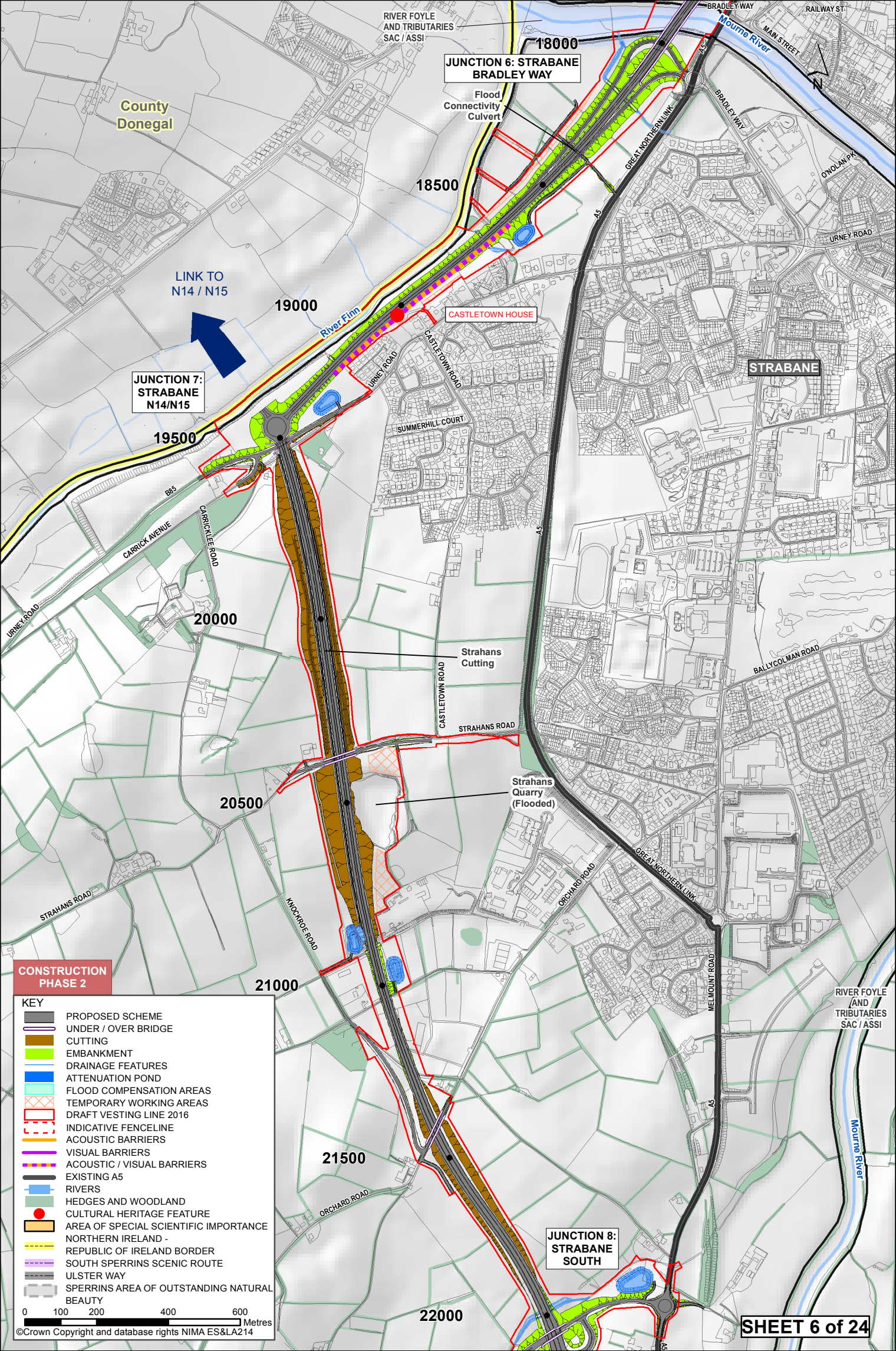
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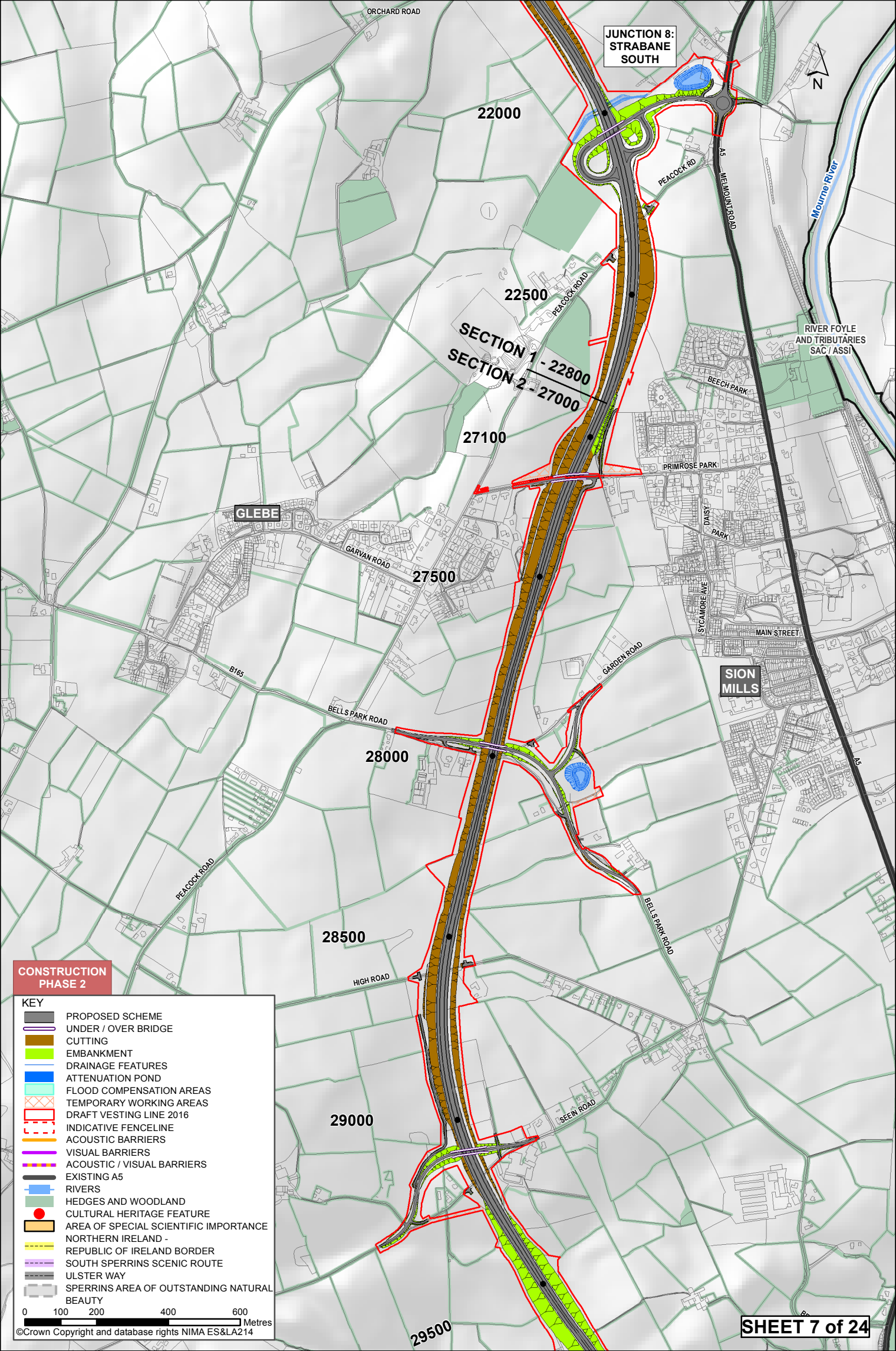
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PEACOCK ROAD
PEACOCK RD
A5
MELMOUNT ROAD
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
SECTION 1 - 22800
SECTION 2 - 27000
27100
BEECH PARK
PRIMROSE PARK
GLEBE
DAISY PARK
GARVAN ROAD
27500
SYCAMORE AVE
MAIN STREET
GARDEN ROAD
SION MILLS
B165
BELLS PARK ROAD
28000
A5
PEACOCK ROAD
28500
BELLS PARK ROAD
HIGH ROAD
SEEIN ROAD
29000
29500
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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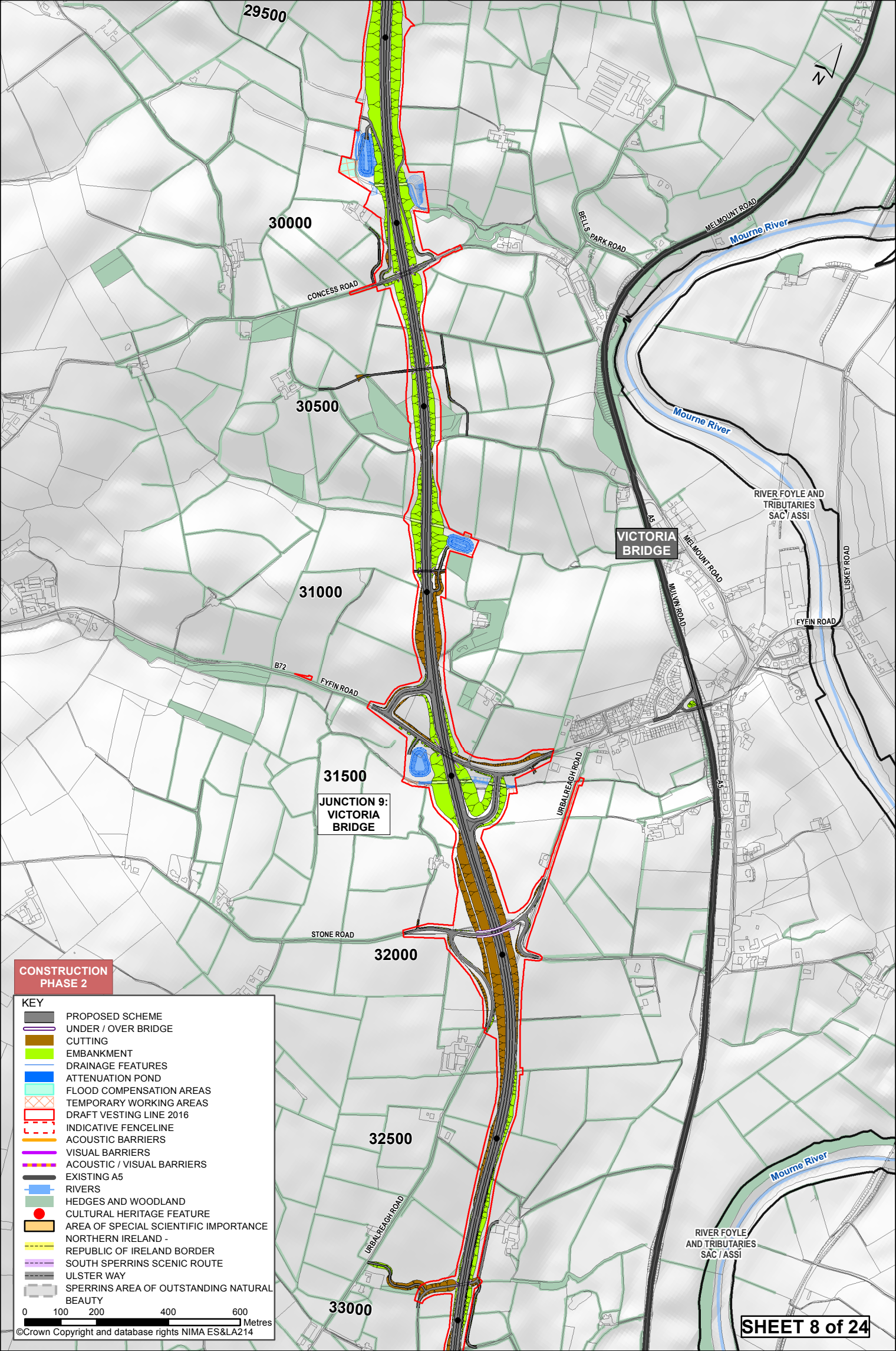
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30000
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31000
31500
32000
32500
33000
CONCESS ROAD
BELLS PARK ROAD
MELMOUNT ROAD
Mourne River
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
VICTORIA BRIDGE
A5
MELMOUNT ROAD
MULVIN ROAD
LISKEY ROAD
FYFIN ROAD
B72
FYFIN ROAD
JUNCTION 9: VICTORIA BRIDGE
URBALREAGH ROAD
A5
STONE ROAD
URBALREAGH ROAD
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
N
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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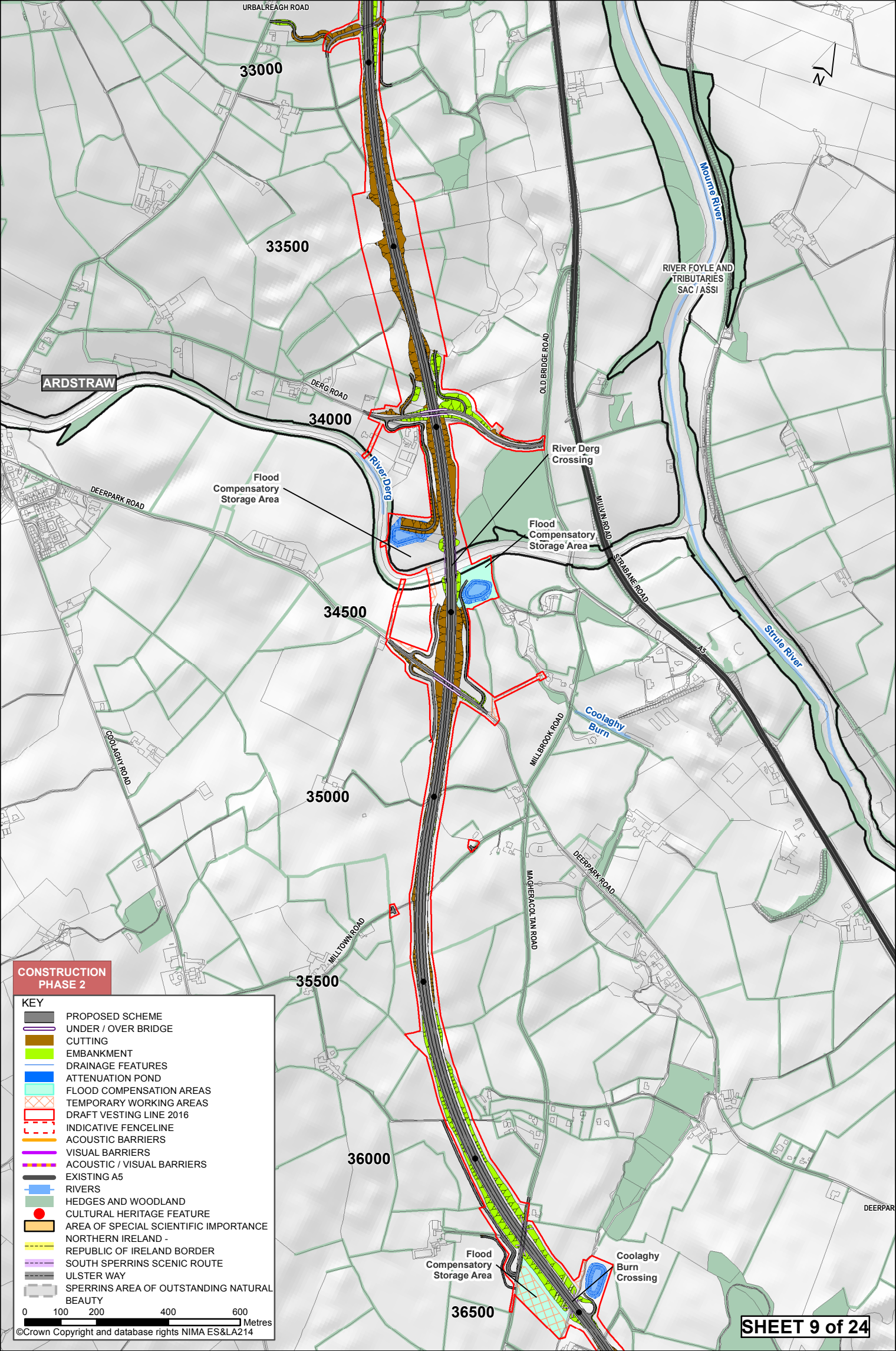
URBALREAGH ROAD
33000
33500
34000
34500
35000
35500
36000
36500
ARDSTRAW
DERG ROAD
DEERPARK ROAD
COOLAGHY ROAD
MILLTOWN ROAD
MILLBROOK ROAD
MAGHERACOLTAN ROAD
OLD BRIDGE ROAD
MILLVIN ROAD
STRABANE ROAD
A5
River Derg
River Derg Crossing
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
Coolaghy Burn
Coolaghy Burn Crossing
DEERPAR
N
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
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Metres
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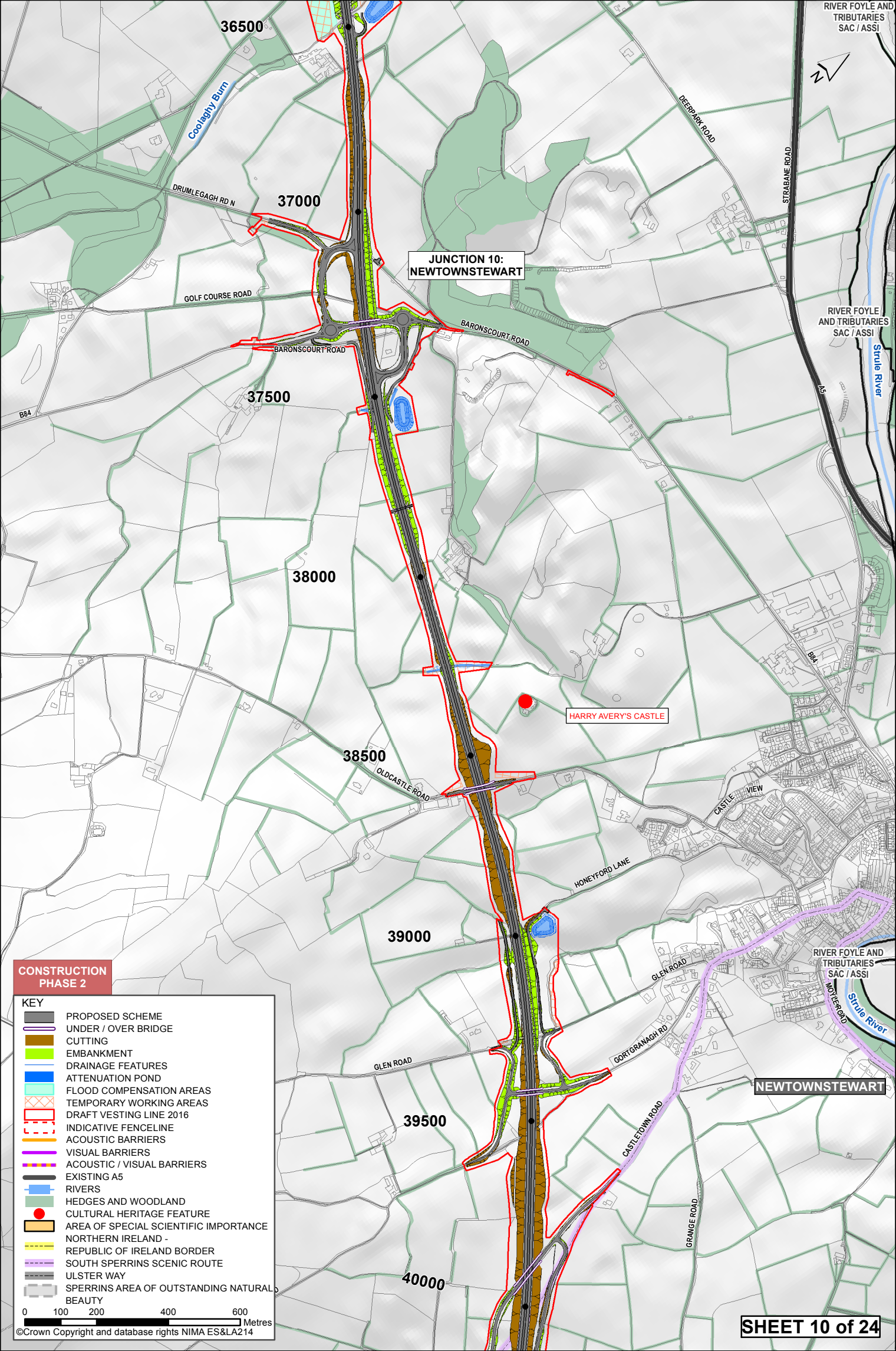
36500
37000
37500
38000
38500
39000
39500
40000
JUNCTION 10: NEWTOWNSTEWART
Coolaghy Burn
DRUMLEGAGH RD N
GOLF COURSE ROAD
BARONSCOURT ROAD
BARONSCOURT ROAD
B84
DEERPARK ROAD
STRABANE ROAD
A5
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
B84
HARRY AVERY'S CASTLE
OLDCASTLE ROAD
CASTLE VIEW
HONEYFORD LANE
GLEN ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
MOTHERROAD
Strule River
GORTGRANAGH RD
GLEN ROAD
NEWTOWNSTEWART
CASTLETOWN ROAD
GRANGE ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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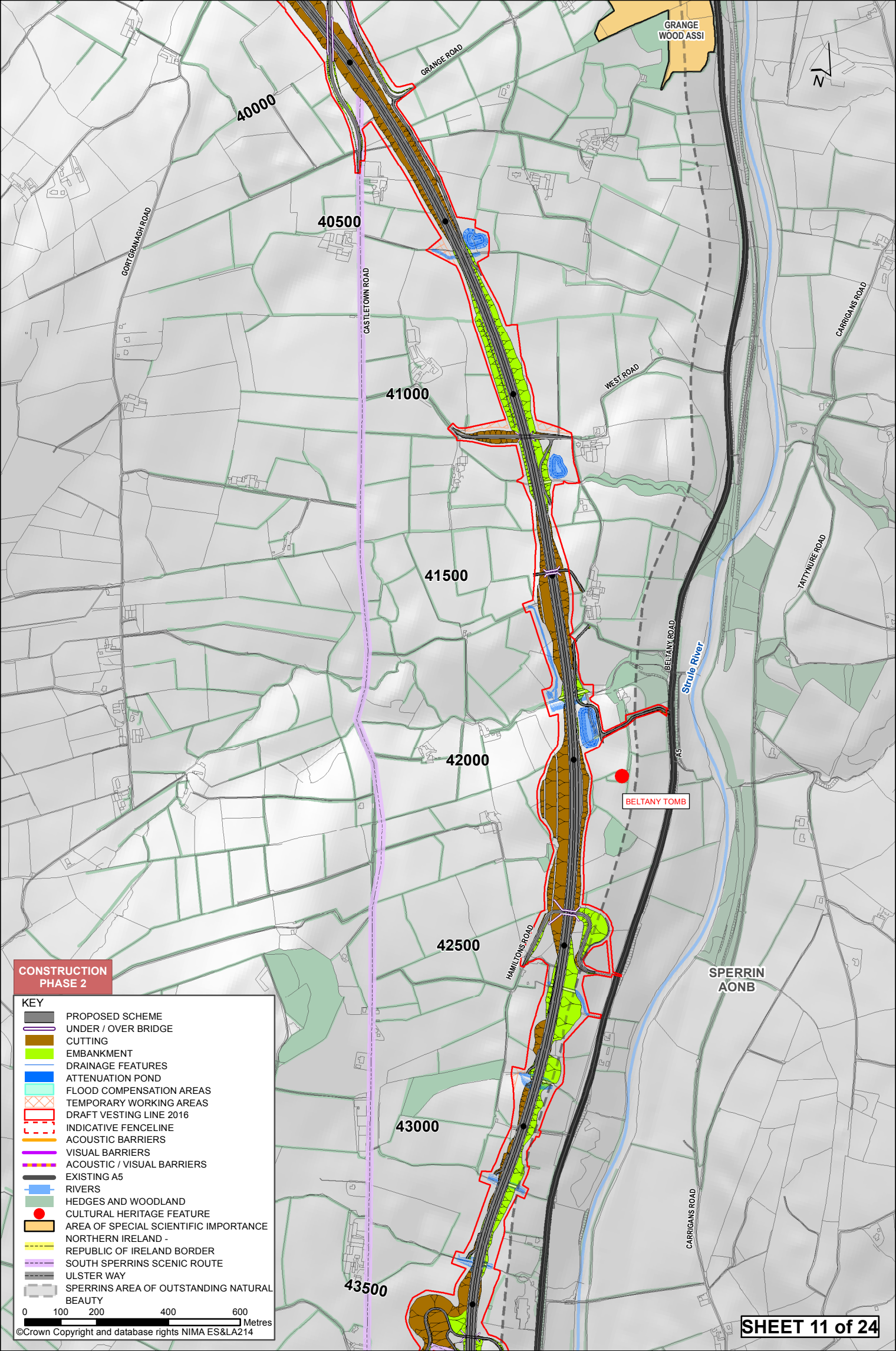

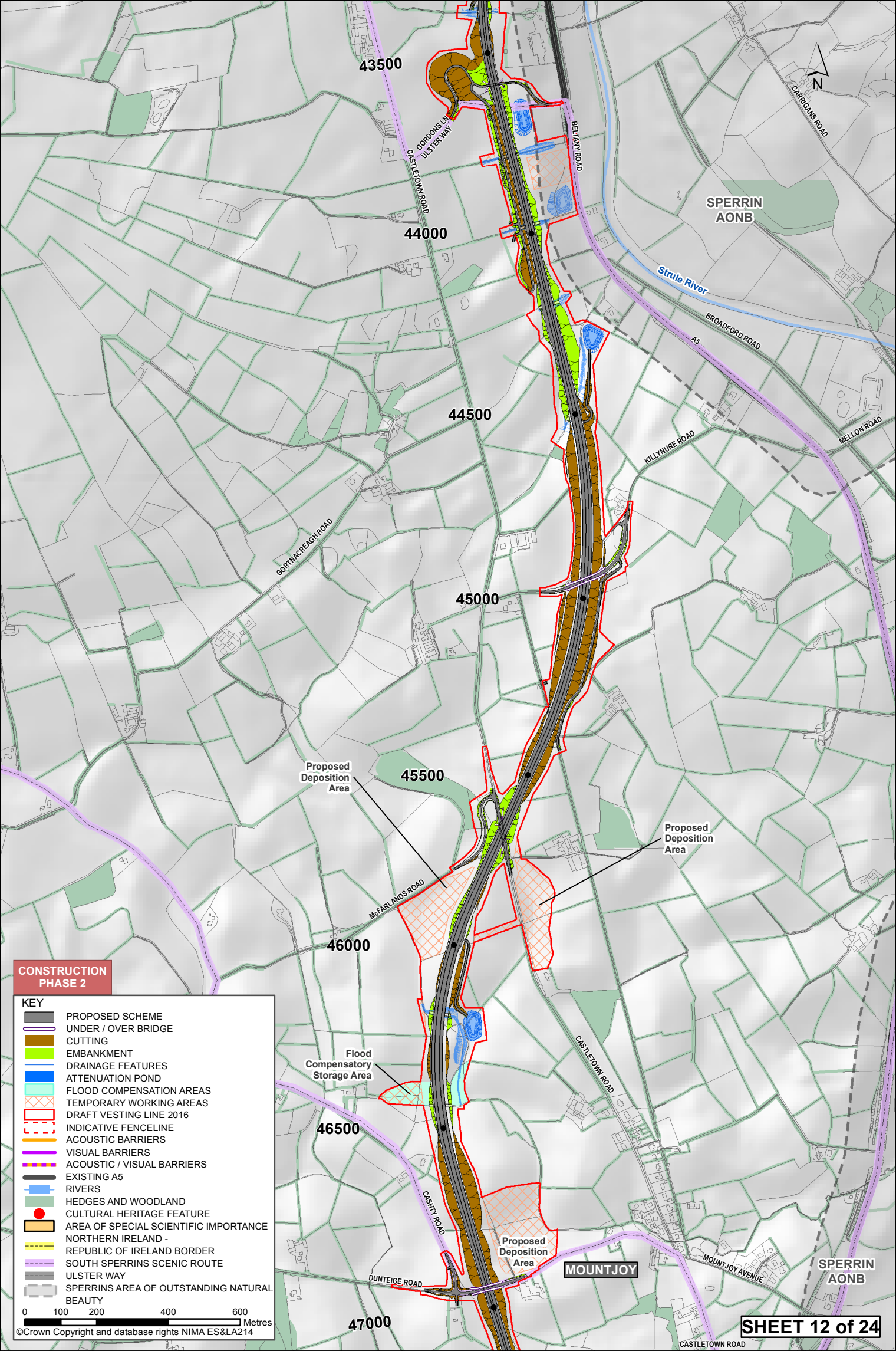
43500
44000
44500
45000
45500
46000
46500
47000
N
CARRIGANS ROAD
BELTANY ROAD
GORDONS LN
ULSTER WAY
CASTLETOWN ROAD
SPERRIN AONB
Strule River
BROADFORD ROAD
A5
MELLON ROAD
KILLYNURE ROAD
GORTNACREAGH ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
McFARLANDS ROAD
Flood Compensatory Storage Area
CASTLETOWN ROAD
CASHTY ROAD
DUNTEIGE ROAD
MOUNTJOY
MOUNTJOY AVENUE
SPERRIN AONB
CASTLETOWN ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
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ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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Metres
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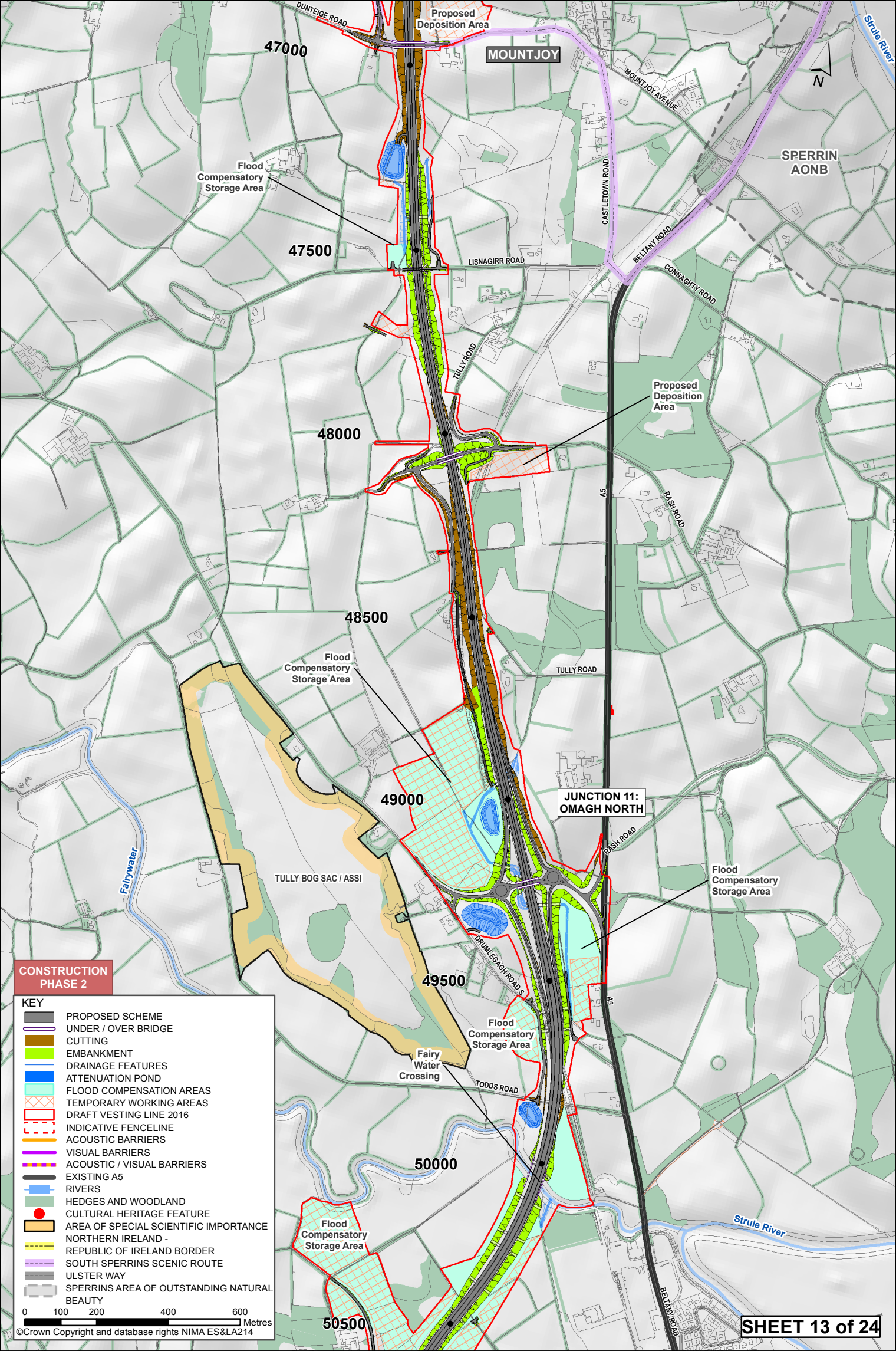
DUNTEIGE ROAD
Proposed Deposition Area
MOUNTJOY
MOUNTJOY AVENUE
Strule River
N
47000
SPERRIN AONB
Flood Compensatory Storage Area
CASTLETOWN ROAD
BELTANY ROAD
47500
LISNAGIRR ROAD
CONNAGHTY ROAD
TULLY ROAD
Proposed Deposition Area
48000
A5
RASH ROAD
48500
Flood Compensatory Storage Area
TULLY ROAD
JUNCTION 11: OMAGH NORTH
49000
RASH ROAD
Fairywater
TULLY BOG SAC / ASSI
Flood Compensatory Storage Area
DRUMLEGAGH ROAD S
A5
49500
Flood Compensatory Storage Area
Fairy Water Crossing
TODDS ROAD
50000
Flood Compensatory Storage Area
Strule River
BELTANY ROAD
50500
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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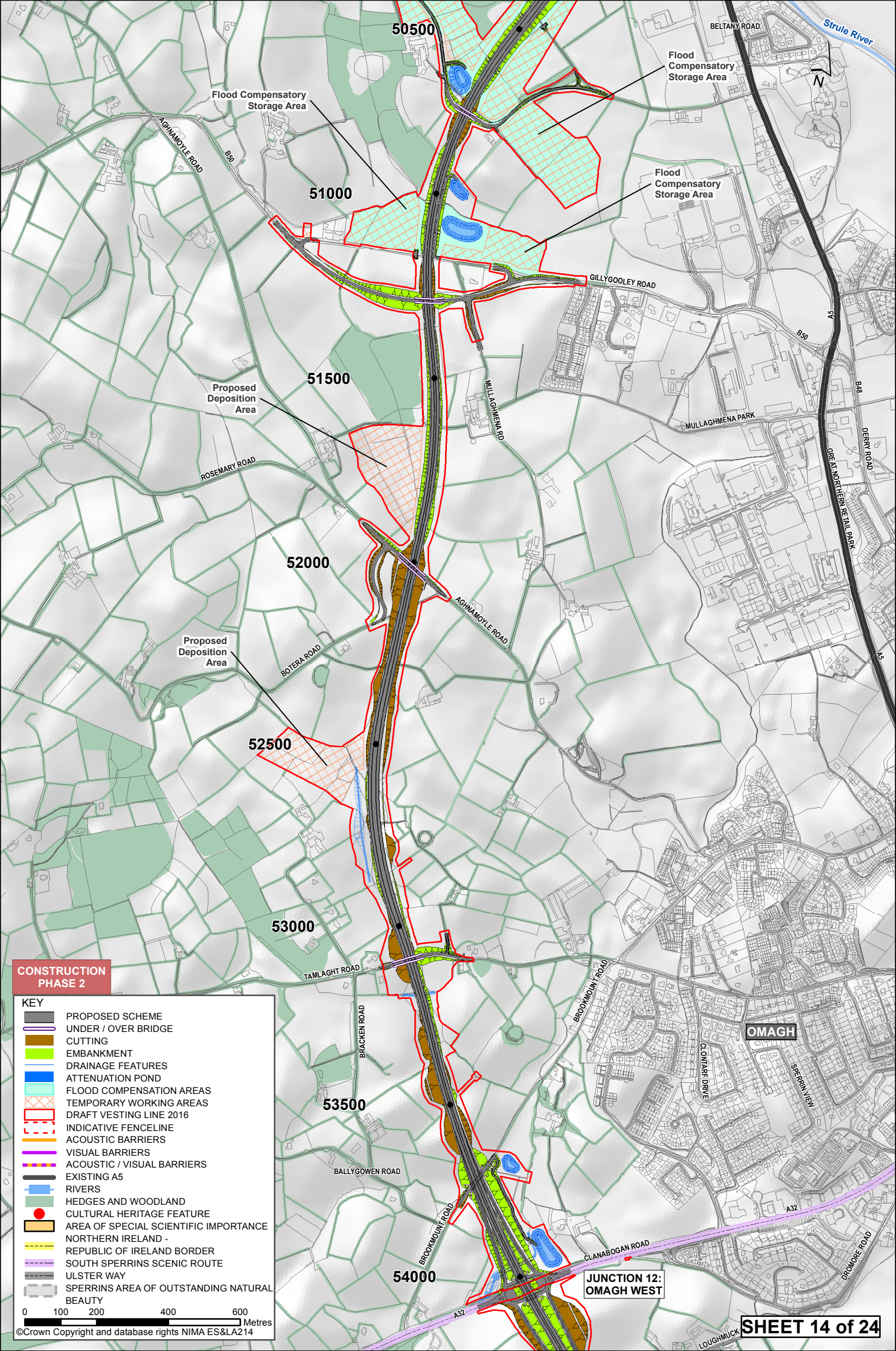

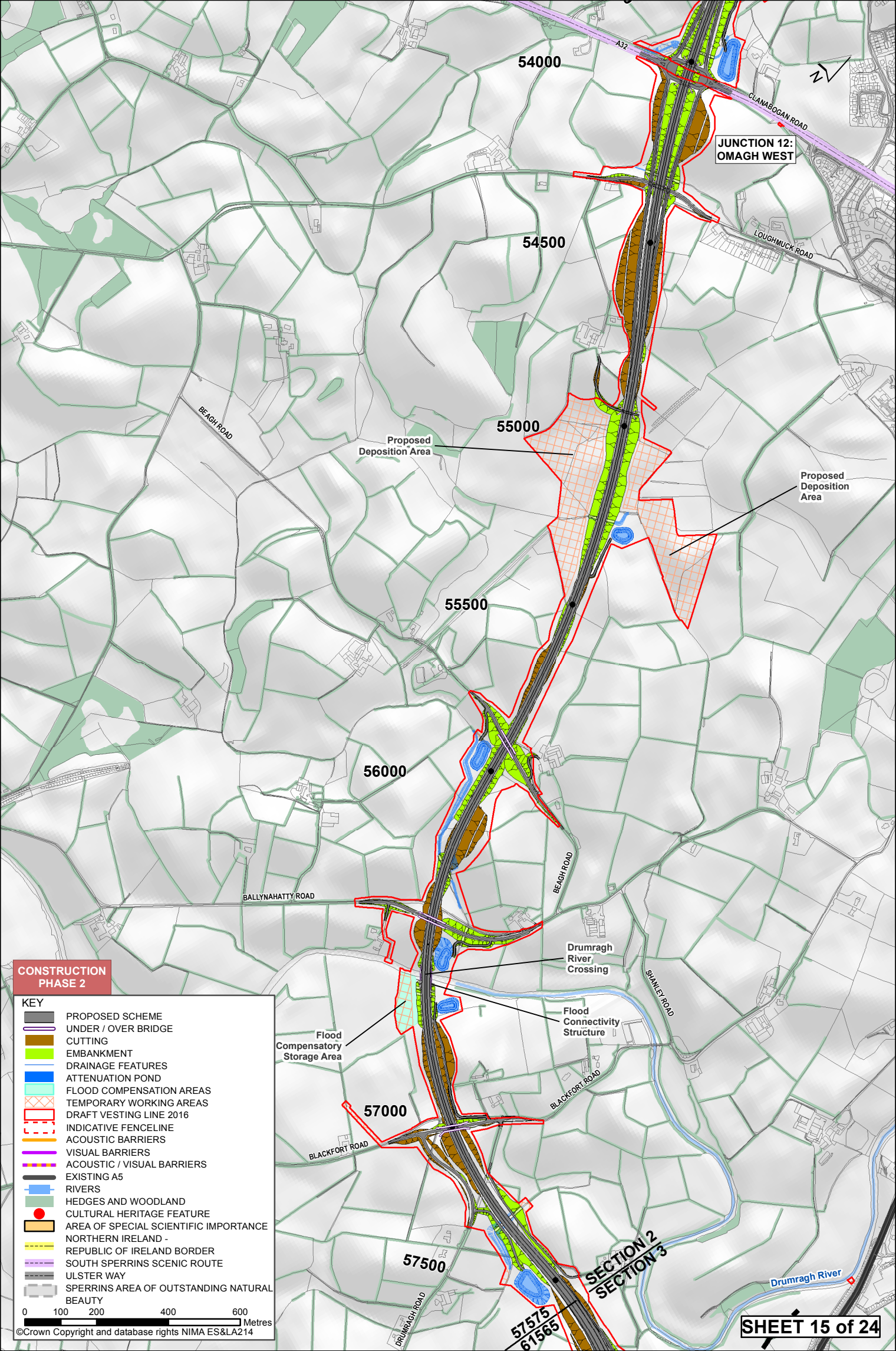
54000
54500
55000
55500
56000
57000
57500
A32
CLANABOGAN ROAD
JUNCTION 12:
OMAGH WEST
LOUGHMUCK ROAD
BEAGH ROAD
Proposed
Deposition Area
Proposed
Deposition
Area
BALLYNAHATTY ROAD
BEAGH ROAD
Drumragh
River
Crossing
SHANLEY ROAD
Flood
Connectivity
Structure
Flood
Compensatory
Storage Area
BLACKFORT ROAD
BLACKFORT ROAD
DRUMRAGH ROAD
SECTION 2
SECTION 3
Drumragh River
57575
61565
CONSTRUCTION
PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL
BEAUTY
0 100 200 400 600
Metres
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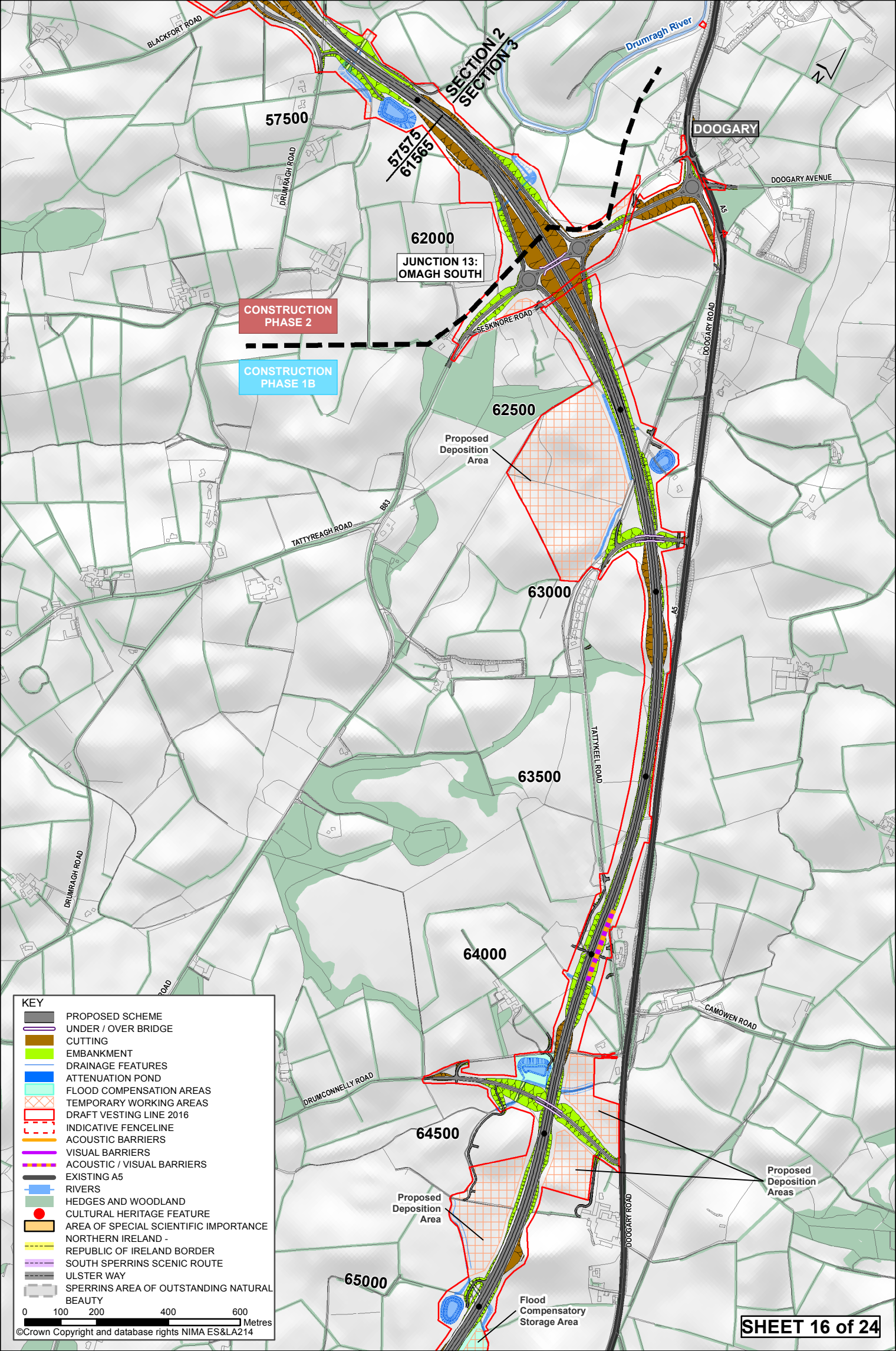
BLACKFORT ROAD
SECTION 2
SECTION 3
Drumragh River
57500
DRUMRAGH ROAD
57575
61565
DOOGARY
DOOGARY AVENUE
A5
62000
JUNCTION 13:
OMAGH SOUTH
CONSTRUCTION
PHASE 2
CONSTRUCTION
PHASE 1B
SESKINORE ROAD
DOOGARY ROAD
62500
Proposed
Deposition
Area
B83
TATTYREAGH ROAD
63000
A5
TATTYKEEL ROAD
63500
DRUMRAGH ROAD
64000
CAMOWEN ROAD
DRUMCONNELLY ROAD
64500
Proposed
Deposition
Areas
Proposed
Deposition
Area
DOOGARY ROAD
65000
Flood
Compensatory
Storage Area
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL
BEAUTY
0 100 200 400 600
Metres
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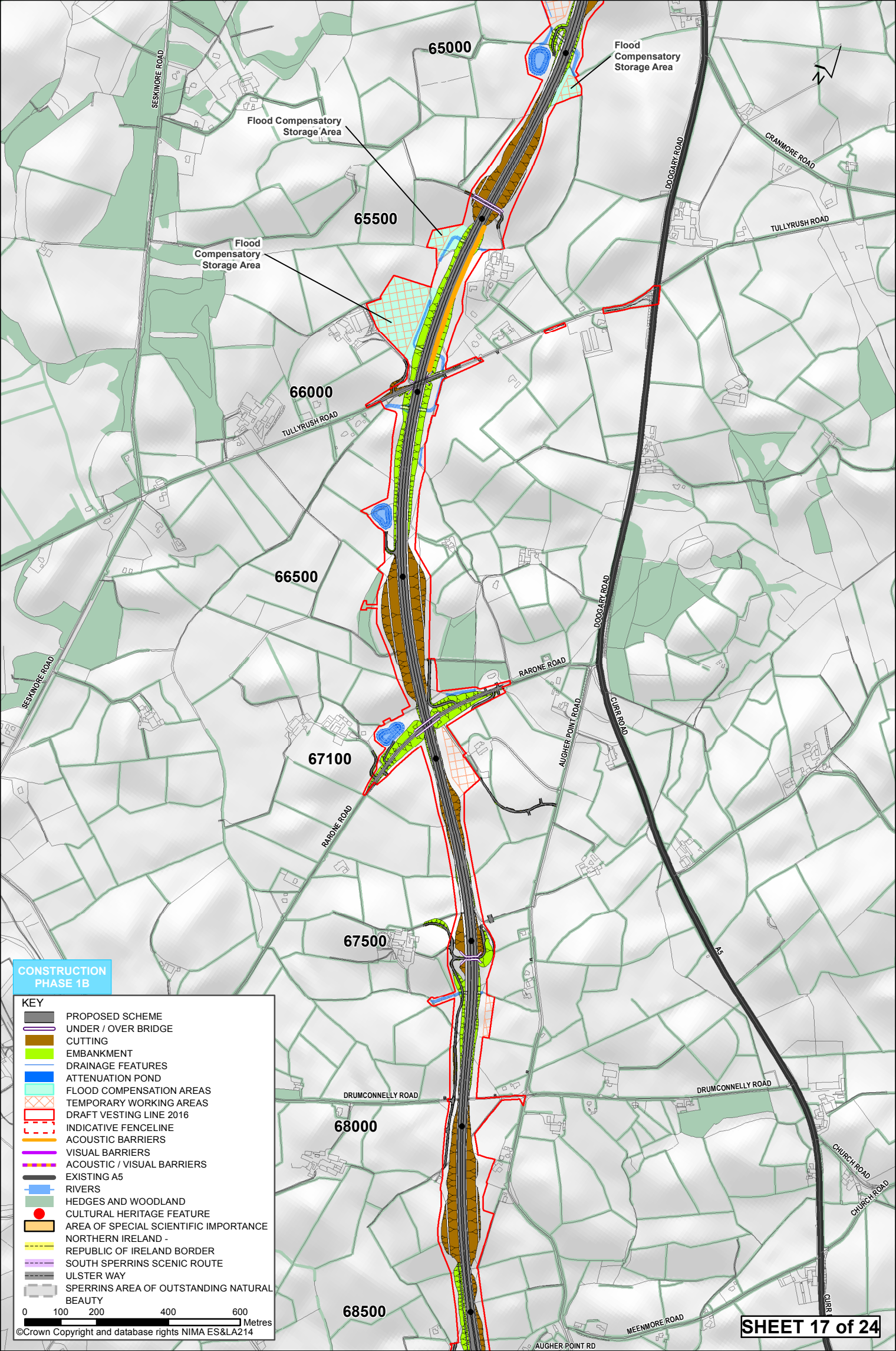
65000
65500
66000
66500
67100
67500
68000
68500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
SESKINORE ROAD
SESKINORE ROAD
DOOGARY ROAD
DOOGARY ROAD
CRANMORE ROAD
TULLYRUSH ROAD
TULLYRUSH ROAD
RARONE ROAD
RARONE ROAD
AUGHER POINT ROAD
CURR ROAD
A5
DRUMCONNELLY ROAD
DRUMCONNELLY ROAD
CHURCH ROAD
CHURCH ROAD
MEENMORE ROAD
AUGHER POINT RD
N
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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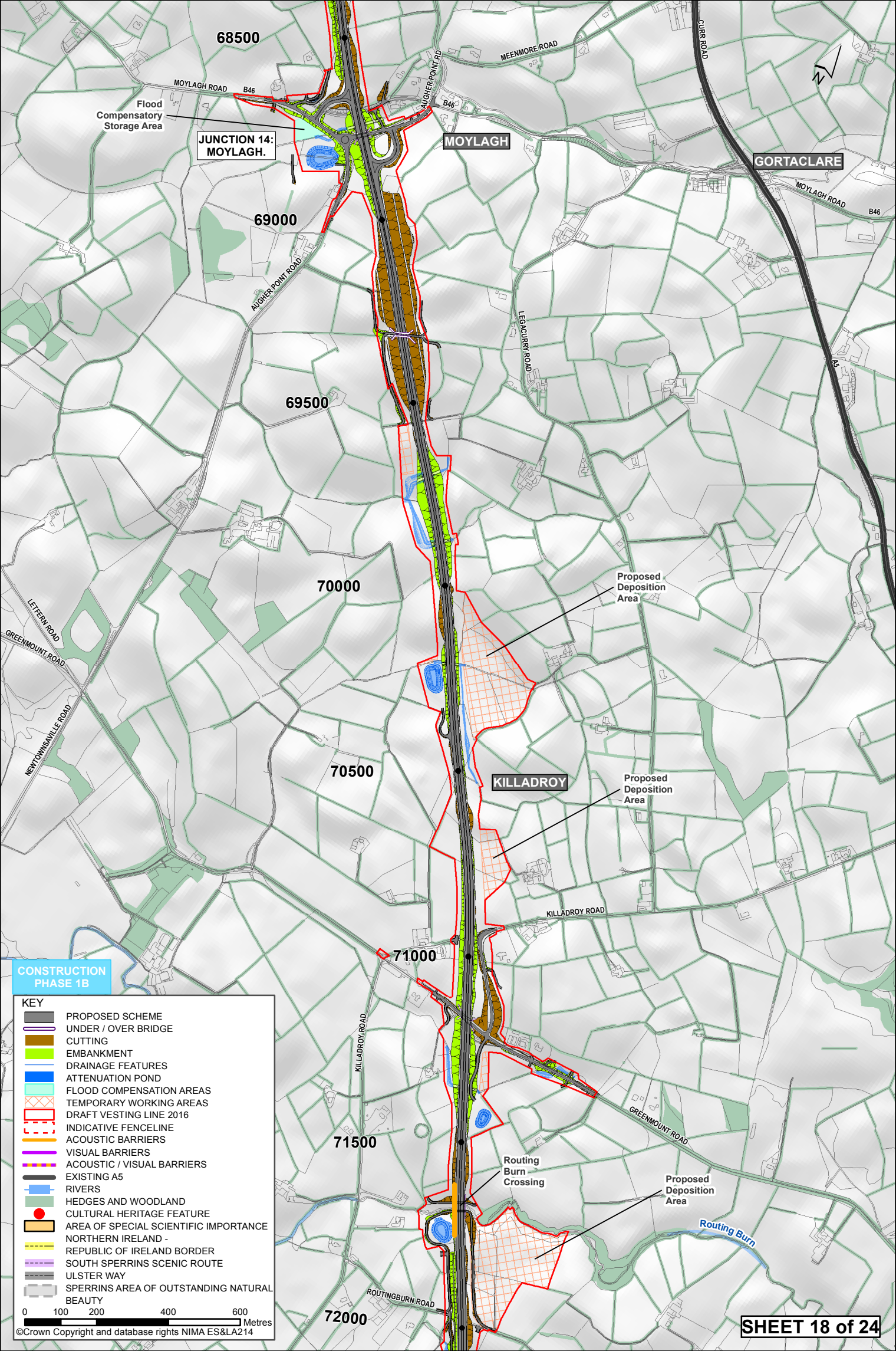
68500
MOYLAGH ROAD
B46
Flood Compensatory Storage Area
JUNCTION 14: MOYLAGH.
AUGHER POINT RD
MEENMORE ROAD
CURR ROAD
MOYLAGH
GORTACLARE
MOYLAGH ROAD
B46
69000
AUGHER POINT ROAD
LEGACURRY ROAD
A5
69500
70000
Proposed Deposition Area
LETTERN ROAD
GREENMOUNT ROAD
NEWTOWNSAVILLE ROAD
70500
KILLADROY
Proposed Deposition Area
KILLADROY ROAD
71000
KILLADROY ROAD
GREENMOUNT ROAD
71500
Routing Burn Crossing
Proposed Deposition Area
Routing Burn
ROUTINGBURN ROAD
72000
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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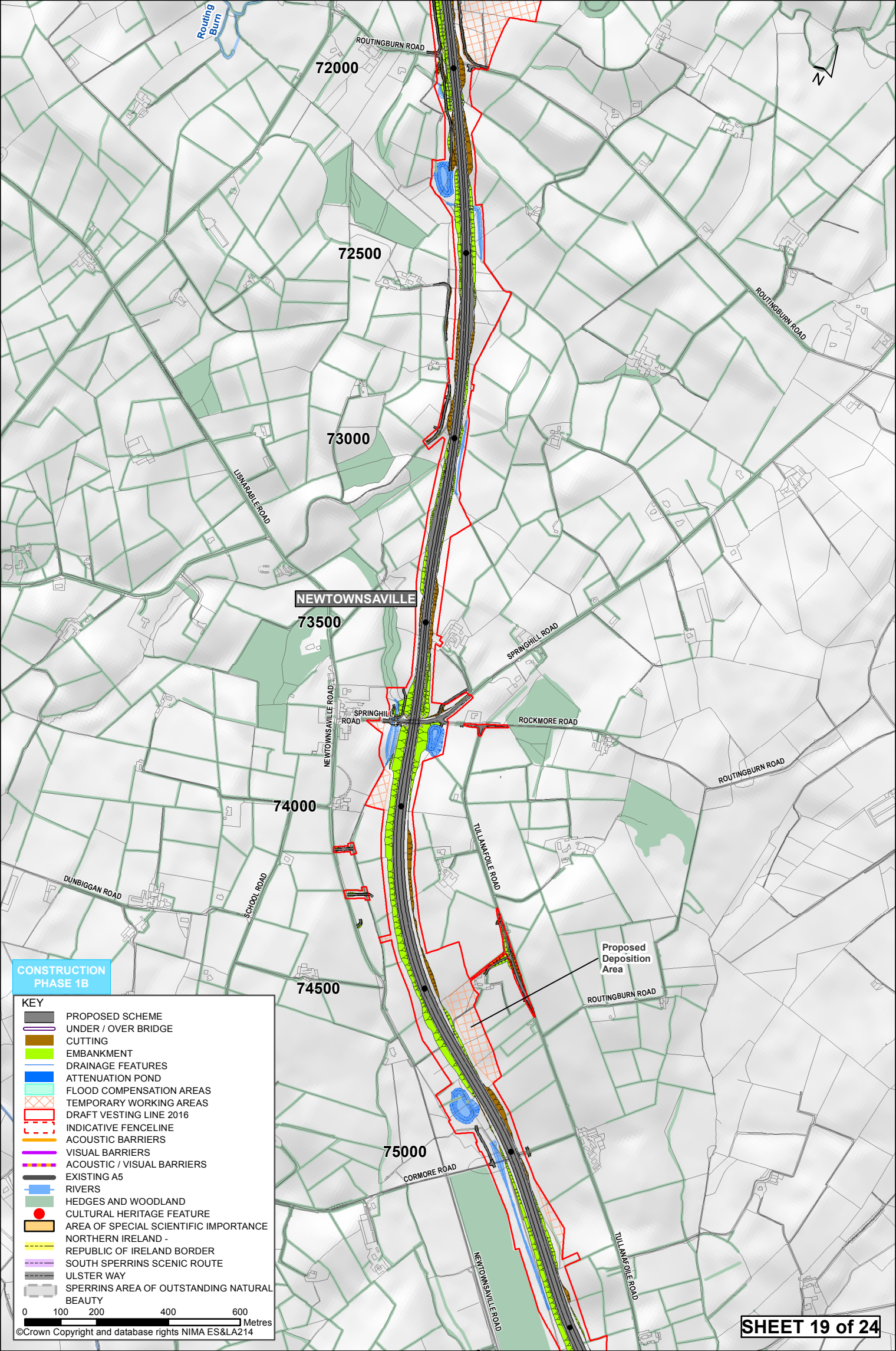
Routing Burn
ROUTINGBURN ROAD
72000
72500
73000
73500
74000
74500
75000
N
LISNARABLE ROAD
NEWTOWNSAVILLE
SPRINGHILL ROAD
NEWTOWNSAVILLE ROAD
SPRINGHILL ROAD
ROCKMORE ROAD
ROUTINGBURN ROAD
TULLANAFOILE ROAD
DUNBIGGAN ROAD
SCHOOL ROAD
Proposed Deposition Area
ROUTINGBURN ROAD
CORMORE ROAD
NEWTOWNSAVILLE ROAD
TULLANAFOILE ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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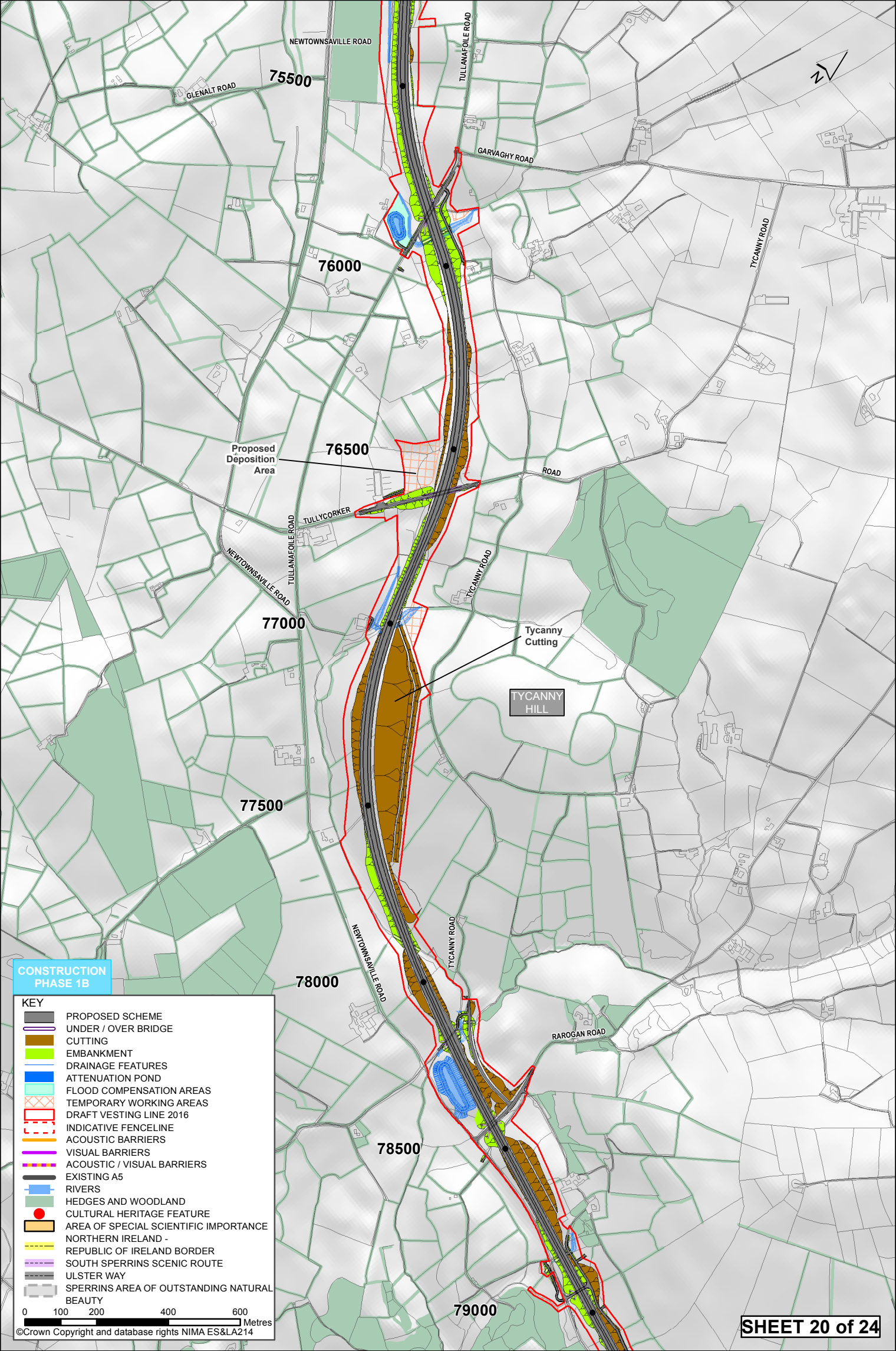
NEWTOWNSAVILLE ROAD
GLENALT ROAD
75500
TULLANAFOILE ROAD
GARVAGHY ROAD
TYCANNY ROAD
76000
Proposed Deposition Area
76500
ROAD
TULLYCORKER
TULLANAFOILE ROAD
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
77000
Tycanny Cutting
TYCANNY HILL
77500
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
78000
RAROGAN ROAD
78500
79000
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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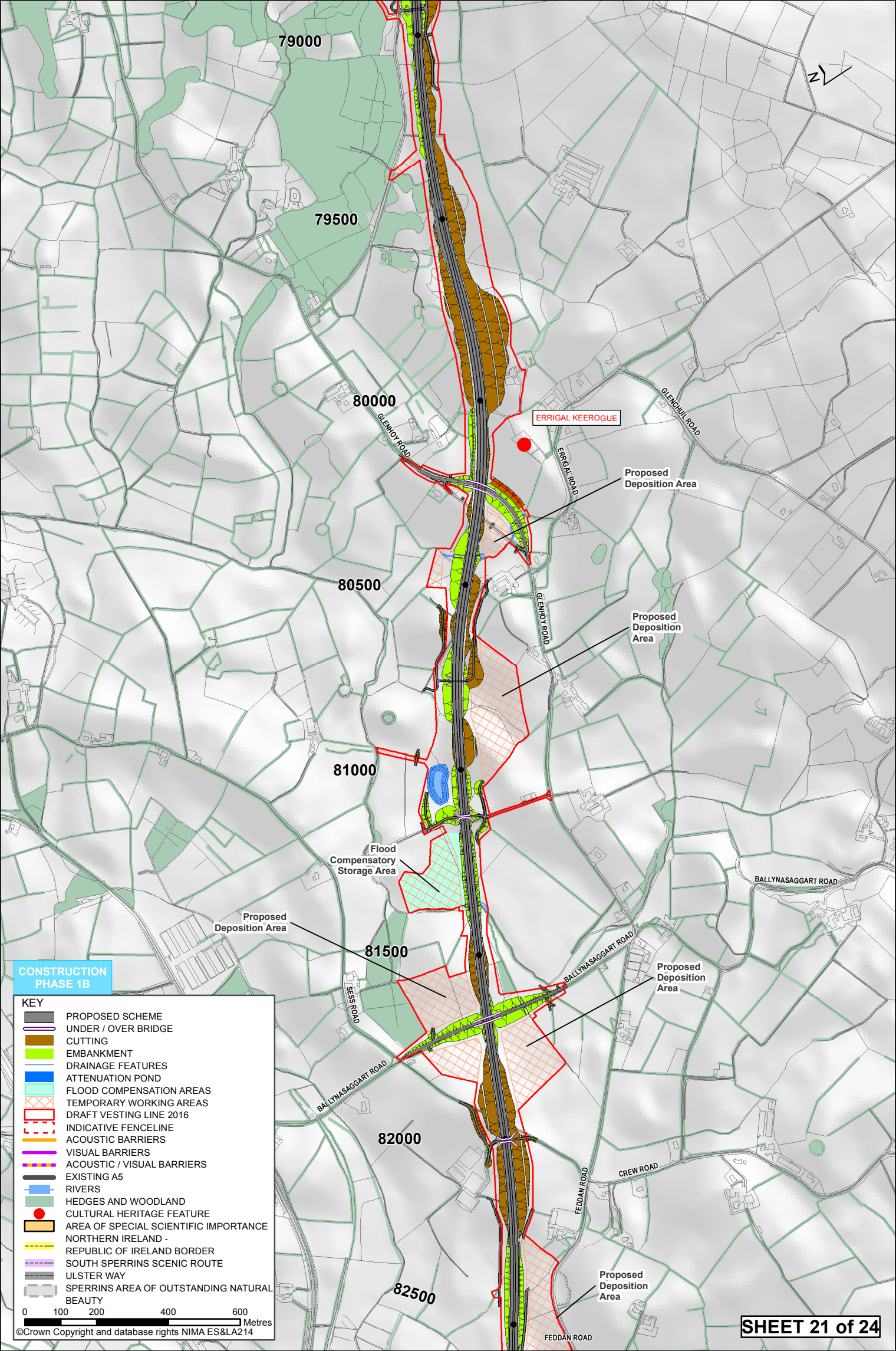
79000
79500
80000
80500
81000
81500
82000
82500
N
ERRIGAL KEEROGUE
GLENHOY ROAD
ERRIGAL ROAD
GLENCHUIL ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
Flood Compensatory Storage Area
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
SESS ROAD
CREW ROAD
FEDDAN ROAD
FEDDAN ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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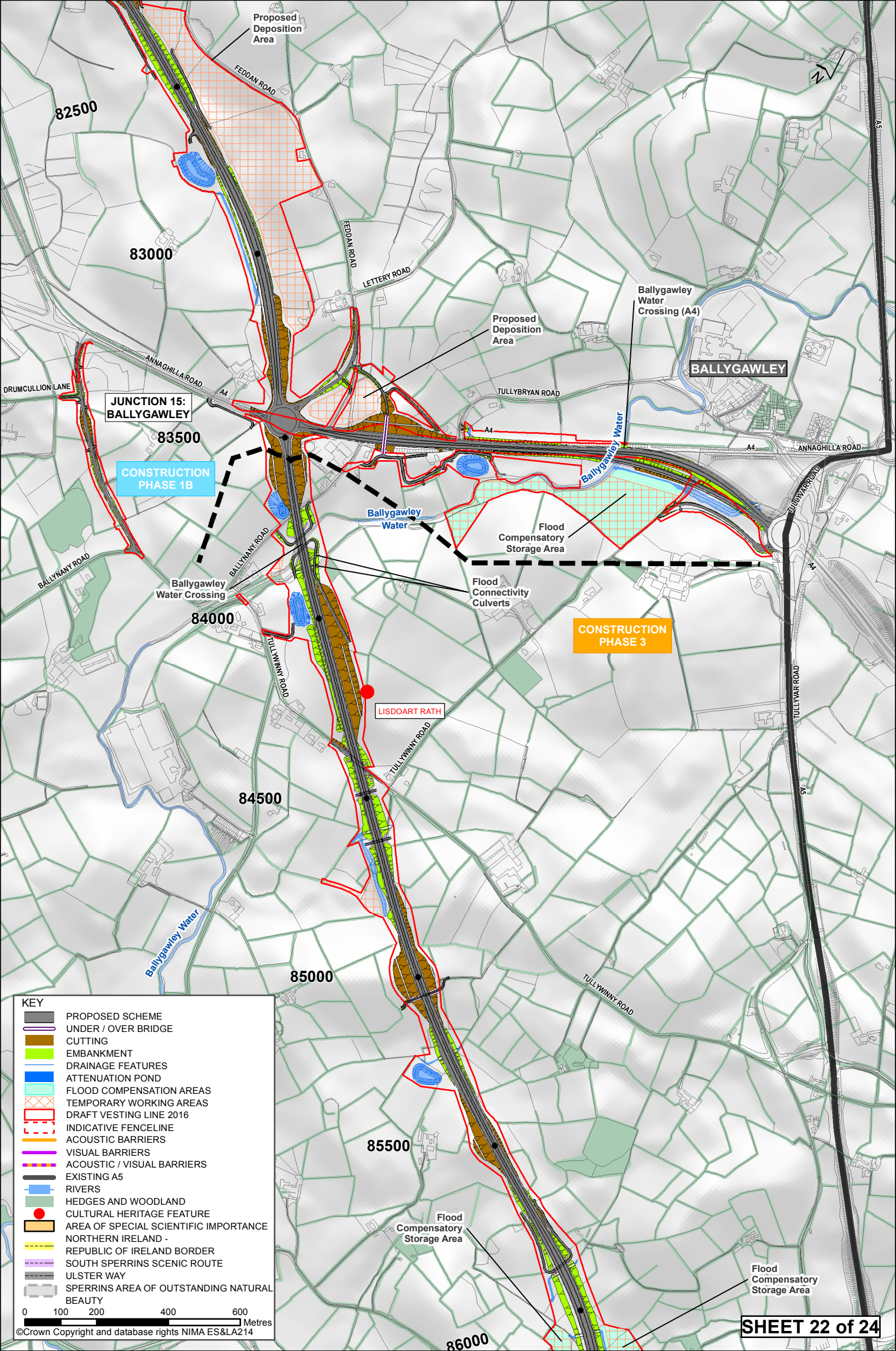
Proposed Deposition Area
FEDDAN ROAD
82500
83000
LETTERY ROAD
Ballygawley Water Crossing (A4)
Proposed Deposition Area
BALLYGAWLEY
ANNAGHILLA ROAD
A4
DRUMCULLION LANE
JUNCTION 15: BALLYGAWLEY
TULLYBRYAN ROAD
83500
CONSTRUCTION PHASE 1B
Ballygawley Water
ANNAGHILLA ROAD
TULLYVAR ROAD
Flood Compensatory Storage Area
BALLYNANY ROAD
Ballygawley Water Crossing
Flood Connectivity Culverts
84000
CONSTRUCTION PHASE 3
TULLYWINNY ROAD
LISDOART RATH
84500
A5
85000
85500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
86000
N
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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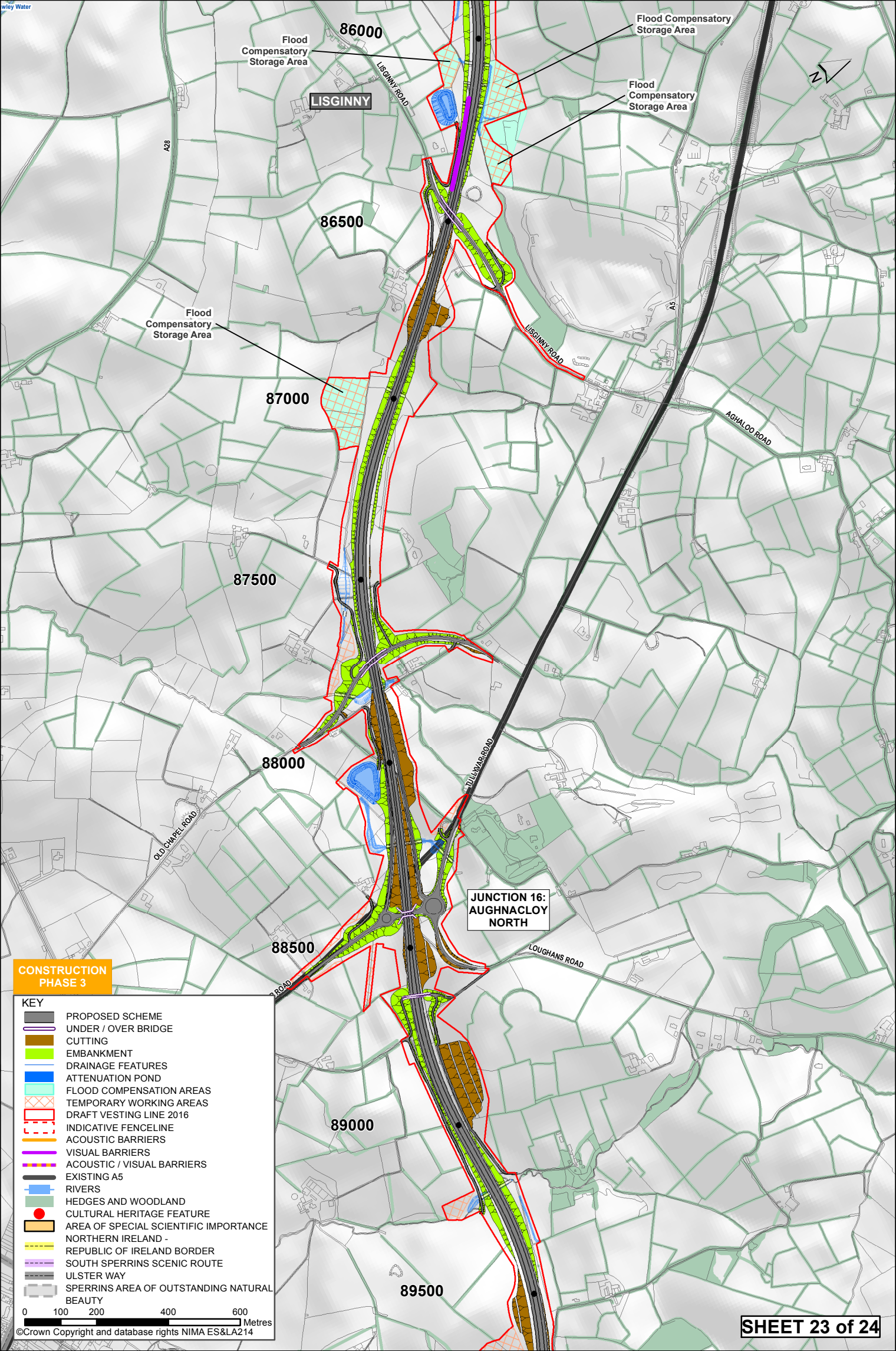
SHEET 22 of 24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Flood Compensatory Storage Area
Flood Compensatory Storage Area
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86000
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87000
87500
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89000
89500
LISGINNY
LISGINNY ROAD
LISGINNY ROAD
A28
A5
AGHALOO ROAD
TULLYVAR ROAD
OLD CHAPEL ROAD
LOUGHANS ROAD
JUNCTION 16: AUGHNACLOY NORTH
N
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
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VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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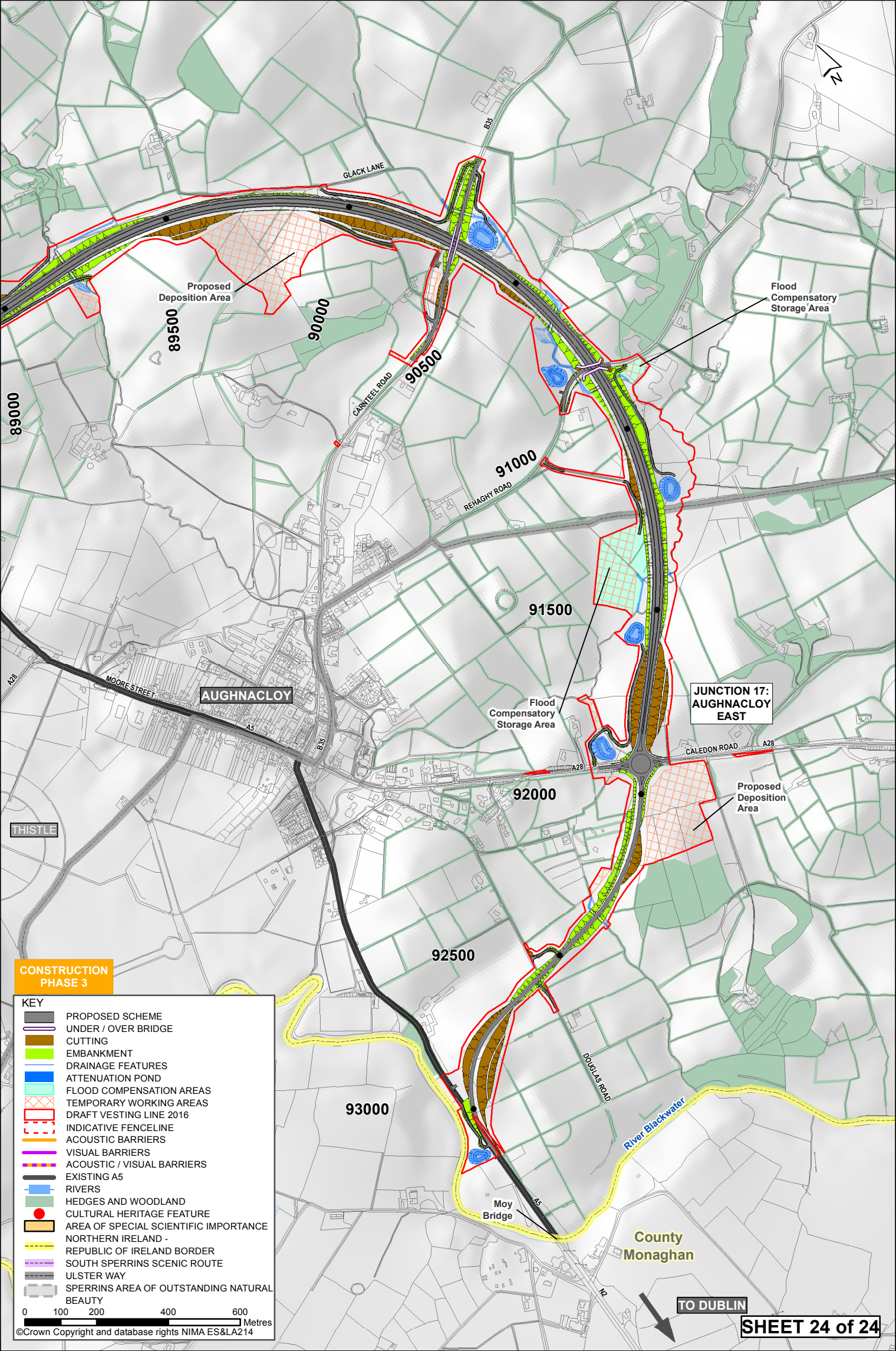
SHEET 23 of 24


N
GLACK LANE
B35
Proposed Deposition Area
89500
90000
90500
89000
CARNTEEL ROAD
Flood Compensatory Storage Area
91000
REHAGHY ROAD
91500
A28
MOORE STREET
AUGHNACLOY
A5
B35
Flood Compensatory Storage Area
JUNCTION 17: AUGHNACLOY EAST
CALEDON ROAD
A28
A28
92000
Proposed Deposition Area
THISTLE
92500
DOUGLAS ROAD
River Blackwater
93000
Moy Bridge
A5
County Monaghan
N2
TO DUBLIN
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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SHEET 24 of 24

Appendix 1: Figures 1 to 10

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Lough Foyle Ramsar Site

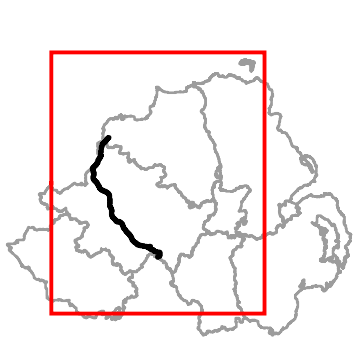
Lough Neagh & Lough Beg Ramsar Site

Barronscourt ASSI

Londonderry
Letterkenny
New Buildings
Lifford
Strabane
Limavady
Coleraine
Ballymoney
Ballymena
Antrim
Cookstown
Omagh
Dungannon
Ballygawley
Aughnacloy
Enniskillen
Monaghan
Armagh
Craigavon
Portadown
Lurgan
Banbridge
Newry

0 5 10 20
Kilometres

N



Legend

- Existing A5
- Proposed Scheme
- Border
- County Boundaries
- Ramsar Site

Client: ROADS Service

Project: A5 WTC Western Transport Corridor

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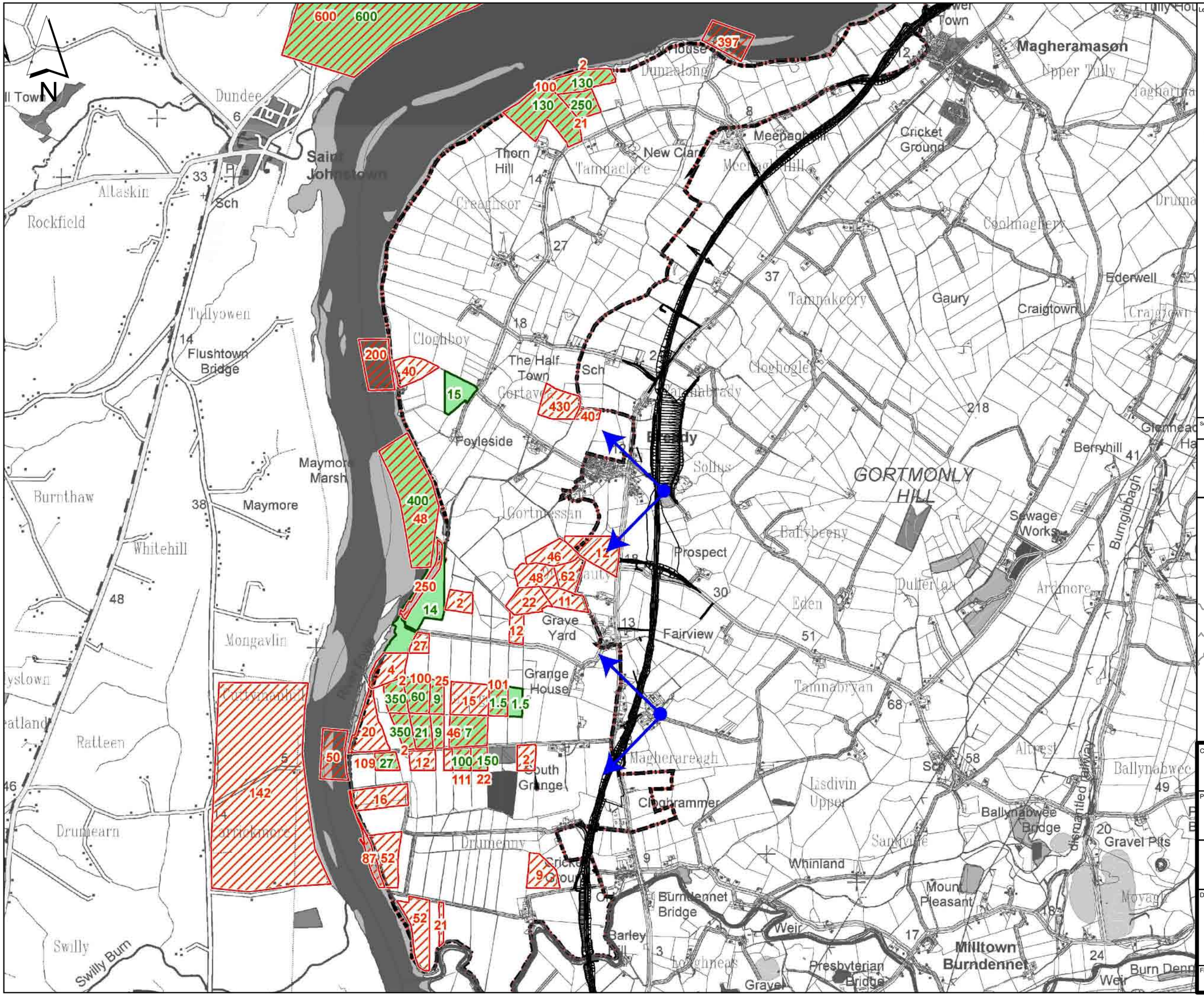
Drawing Title: Report on Information to Inform an Appropriate Assessment: Ramsar Sites
Ramsar Site relationship to A5WTC

Figure No: Figure 1

Version: A



Legend

PROPOSED SCHEME

BIRDS SPECIES AND COUNTS

10 WHOOPER SWAN

10 GREYLAG GOOSE

BIRD HABITAT BOUNDARY

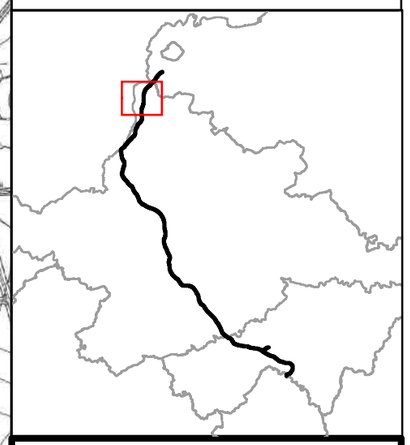
VIEWING POINT FROM

0 0.5 1

SCALE: 1:25,000 KILOMETRES

Scale @A3

1:25,000



Client

transportni

Project

A5 WTC

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Drawing Title

ENVIRONMENTAL STATEMENT

WHOOPER SWAN AND GREYLAG RESULTS (PEAK COUNTS-2010)

Figure No

FIGURE 2 (ES FIGURE 11.67)

Version

A

N

WS: 1

WS: 21 / GL: 1

WS: 35

WS: 205

WS: 70 / GL: 2

WS: 74 / GL: 65

WS: 489 / GL: 151

Legend

PROPOSED SCHEME

AREAS AND PEAK COUNTS (WS = WHOOPER SWAN, GL = GREYLAG GOOSE)

APPROXIMATE AREA COVERED BY SURVEY

SURVEY VANTAGE POINTS

Scale @A3

1:25,000

Client

transportni

Project

A5 WTC Western Transport Corridor

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Drawing Title

ENVIRONMENTAL STATEMENT

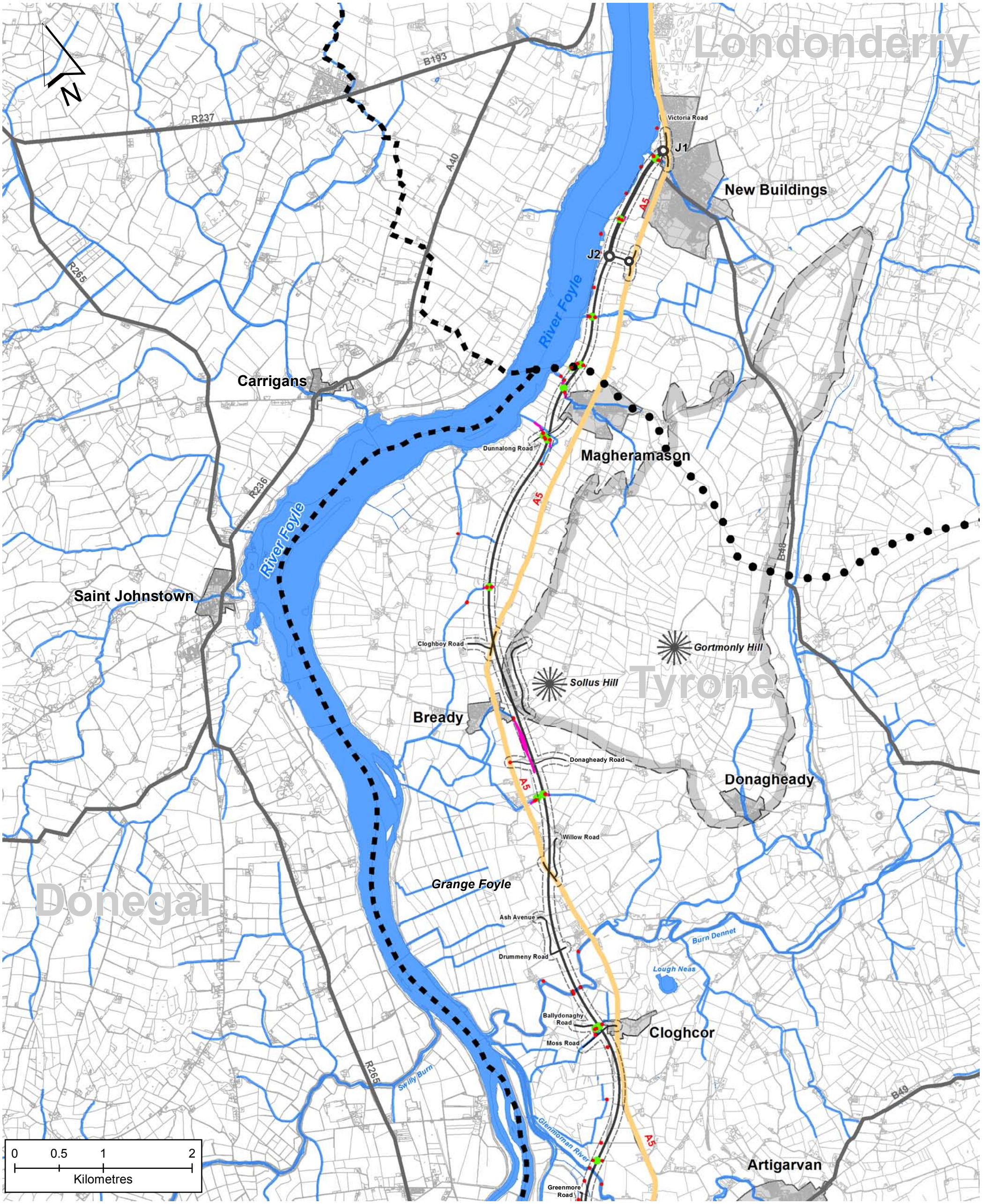
WHOOPER SWAN AND GREYLAG RESULTS (PEAK COUNTS)

Figure No

FIGURE 3 (ES FIGURE 11.68)

Version

B



Client: ROADS Service

Project: A5 WTC

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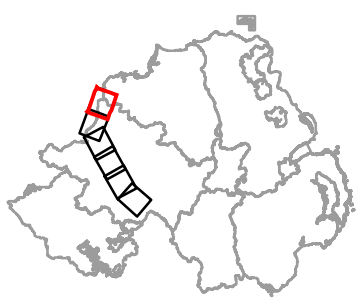
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES

Culvert, Outfall and Diversion Locations

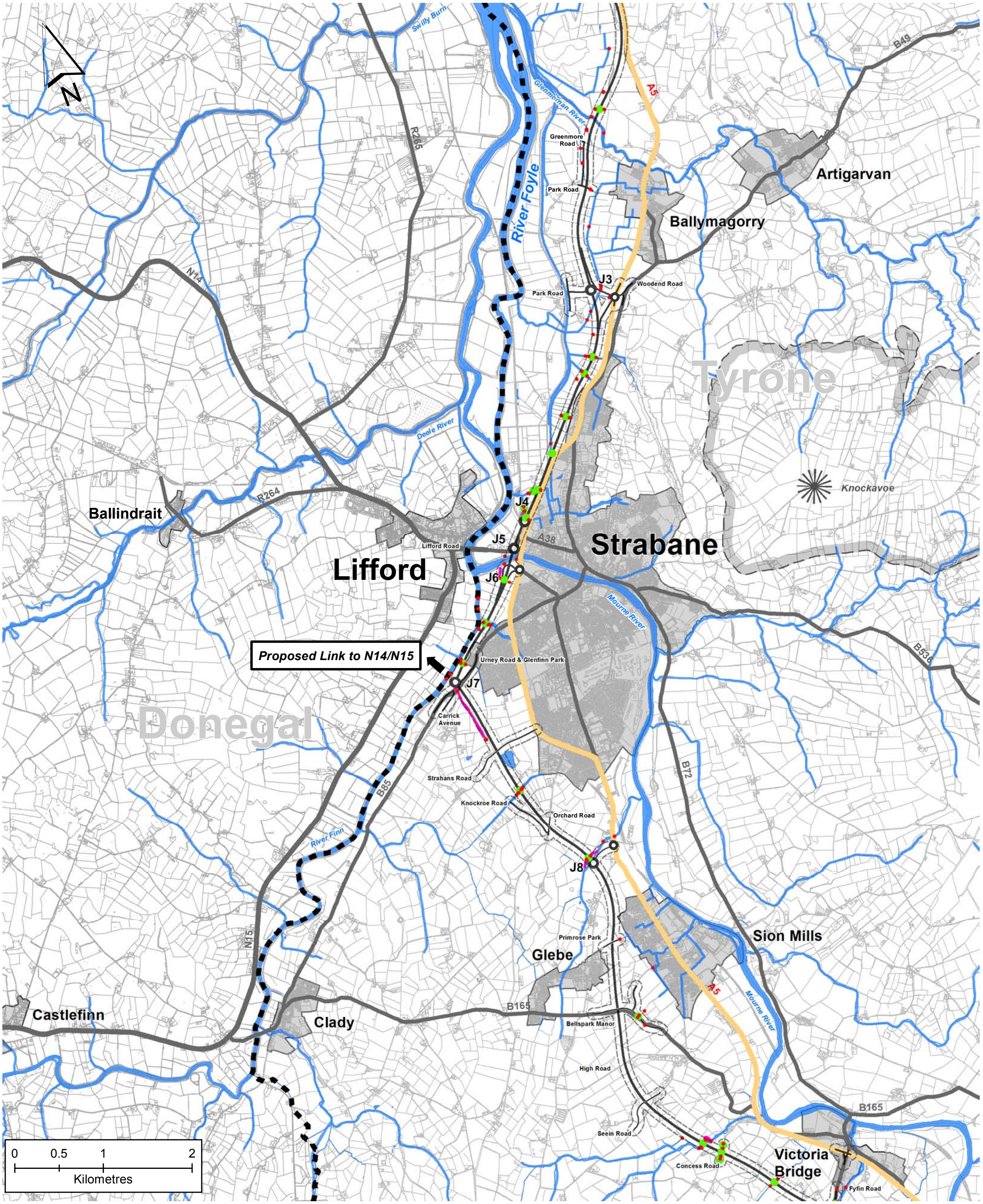
Figure No: Figure 4

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



Client: ROADS Service

Project: A5 WTC

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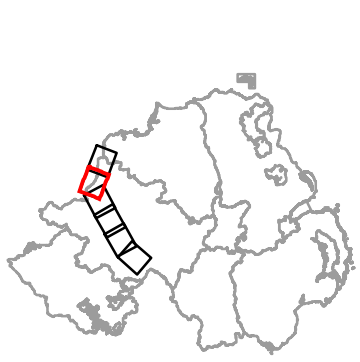
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES

Culvert, Outfall and Diversion Locations

Figure No: Figure 5

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
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- Drainage Outfall
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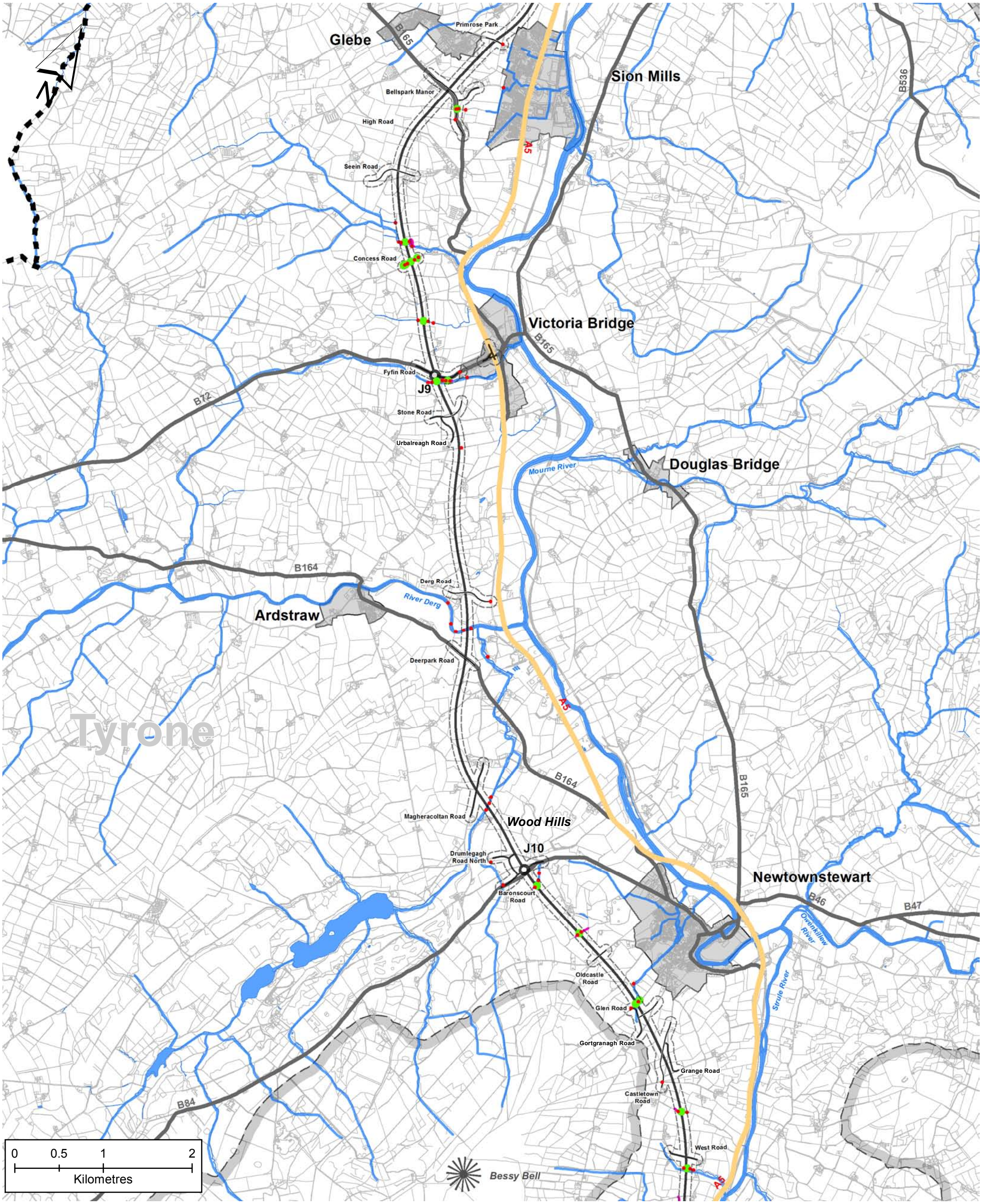
- Drainage Diversion



Client: ROADS Service

Project: A5 WTC

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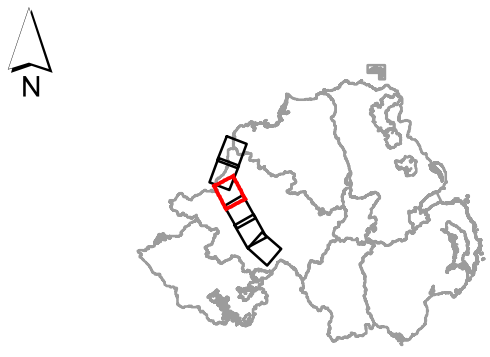
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES

Culvert, Outfall and Diversion Locations

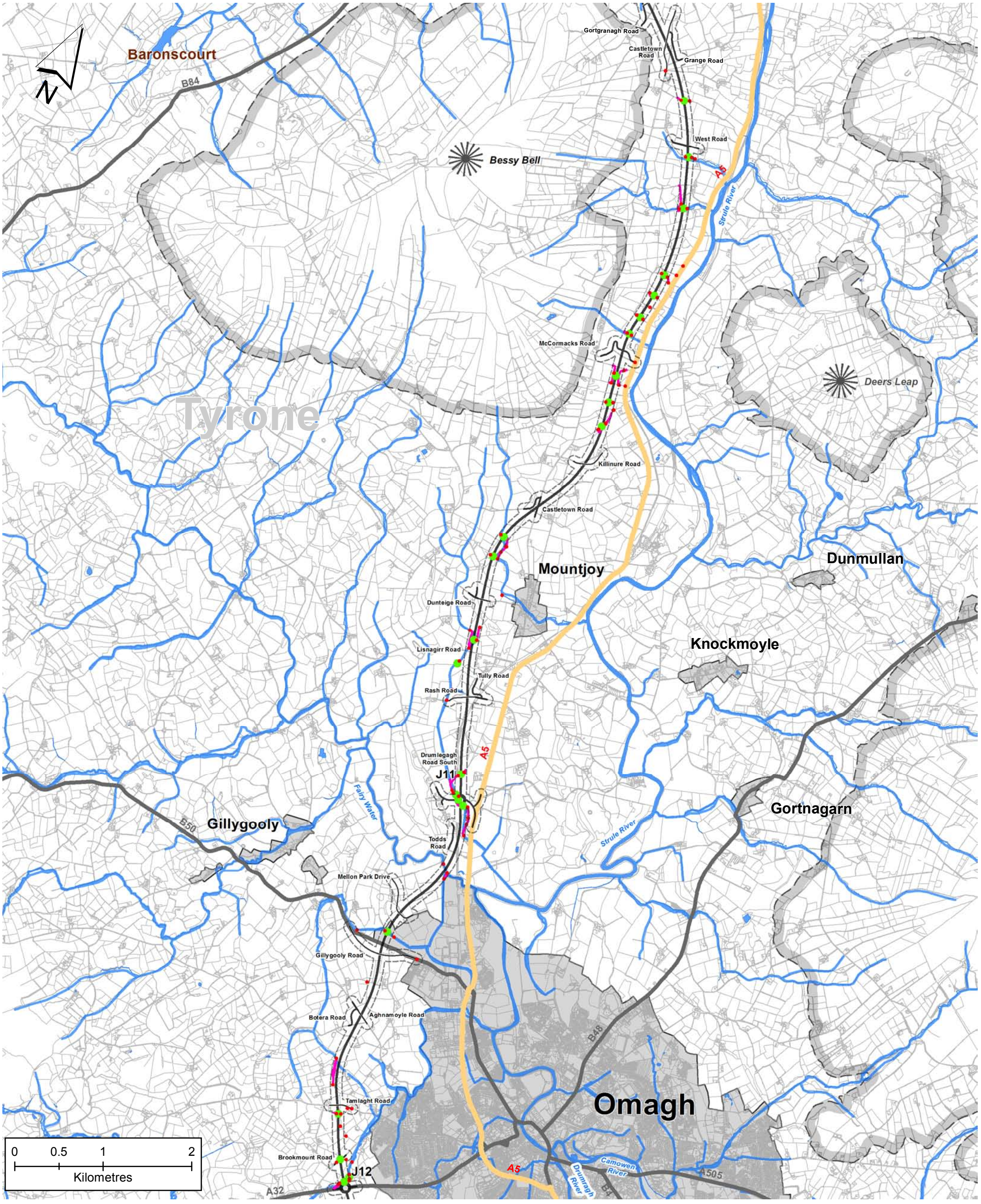
Figure No: **Figure 6**

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



Client: ROADS Service

Project: A5 WTC

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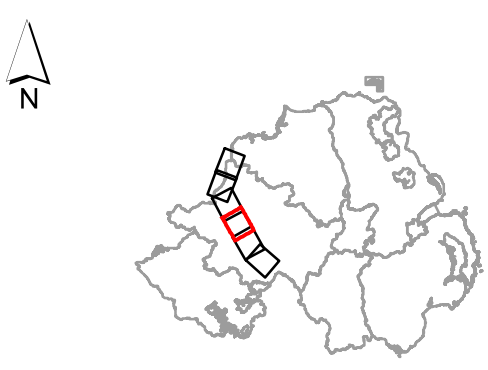
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES

Culvert, Outfall and Diversion Locations

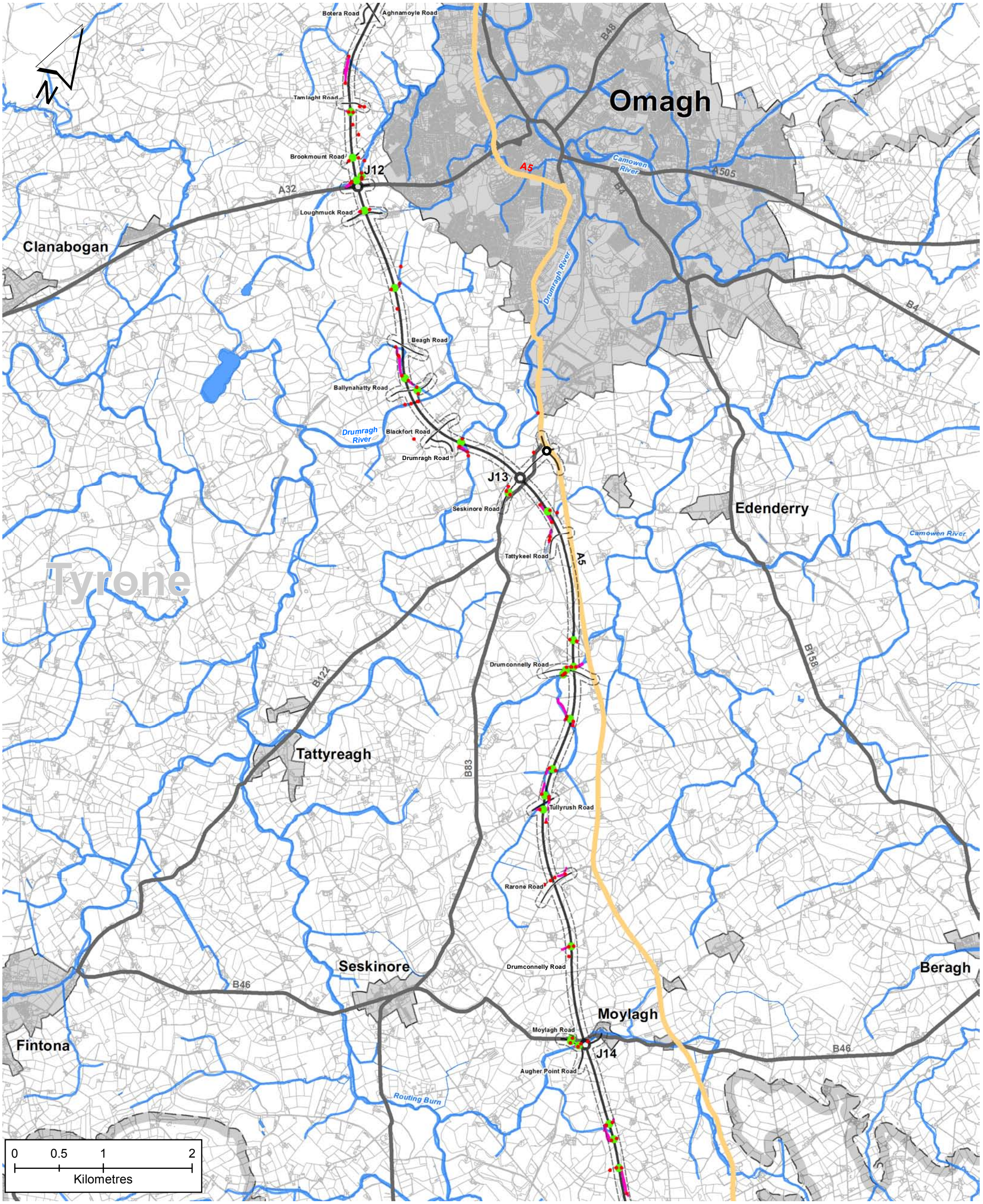
Figure No: **Figure 7**

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



Client: ROADS Service

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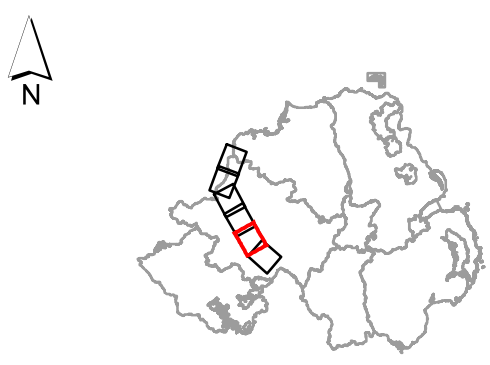
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES

Culvert, Outfall and Diversion Locations

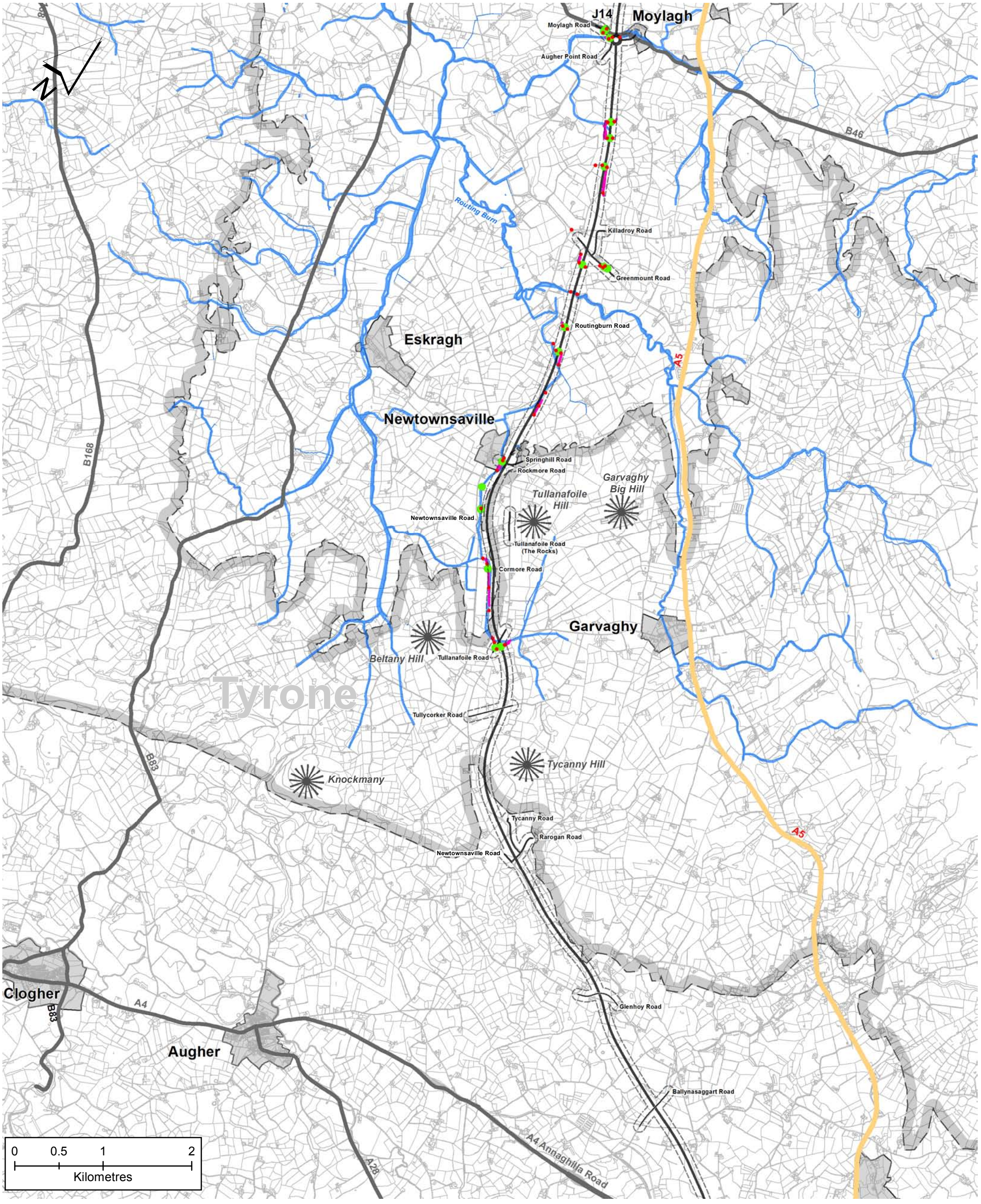
Figure No: Figure 8

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
- Prominent Local Hills (Indicative Extents)
- Centreline Buffer (65m)
- Rivers and Water Bodies
- Drainage Outfall
- Drainage Culvert
- Drainage Diversion



Client: ROADS Service

Project: A5 WTC

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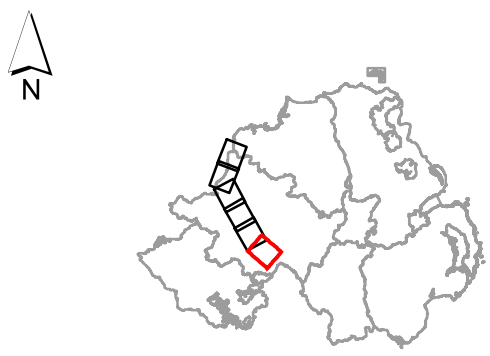
Drawing Title: REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES
Culvert, Outfall and Diversion Locations

Figure No: Figure 9

Version: A



Legend

- Existing A5
- Proposed Scheme
- Junction Location
- Side Road Connections
- Roads (A Class / B Class)
- Border
- County Boundaries
- Settlements
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- Rivers and Water Bodies
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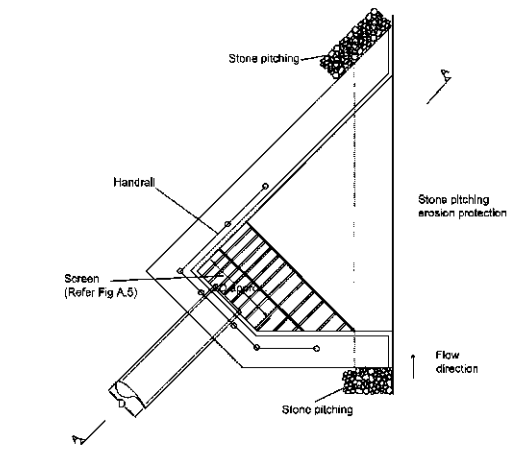
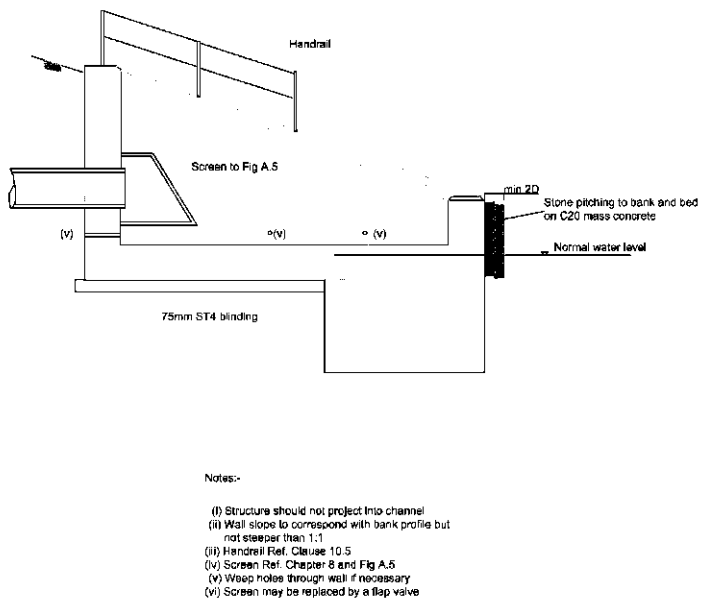
- Drainage Culvert
- Drainage Diversion



Plan

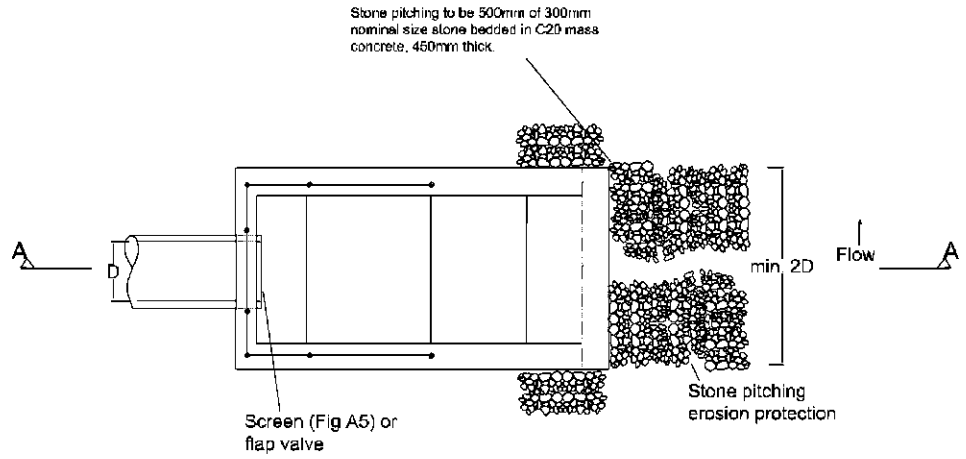


Notes:-

(i) Structure should not project into channel
(ii) Wall slope to correspond with bank profile but not steeper than 1:1
(iii) Handrail Ref. Clause 10.5
(iv) Screen Ref. Chapter 8 and Fig A.5
(v) Weep holes through wall if necessary
(vi) Screen may be replaced by a flap valve

Section 'A-A'

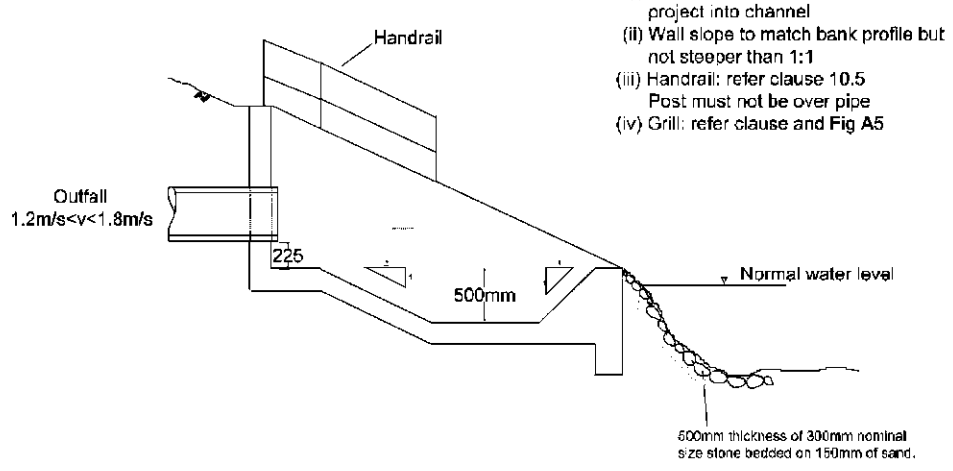
Figure A1: Typical Outfall Headwall



Plan

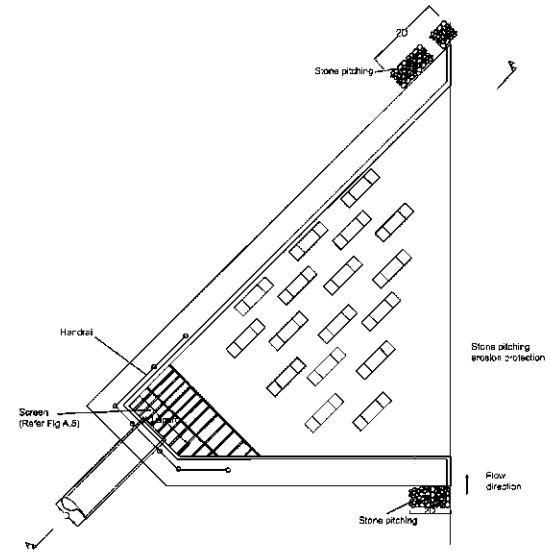
Notes:

(i) Structure should not project into channel
(ii) Wall slope to match bank profile but not steeper than 1:1
(iii) Handrail: refer clause 10.5
Post must not be over pipe
(iv) Grill: refer clause and Fig A5

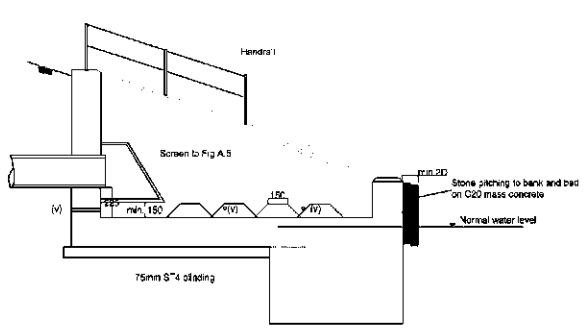


Section 'A-A'

Figure A3: Headwall with Stilling Basin



Plan



Notes:-

(i) Structure should not project into channel
(ii) Wall slope to correspond with bank profile but not steeper than 1:1
(iii) Handrail Ref. Clause 10.5
(iv) Screen Ref. Chapter 8 and Fig A.5
(v) Weep holes through wall if necessary
(vi) Screen may be replaced by a flap valve

Section 'A-A'

Figure A4: Headwall with Baffle Blocks

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Project: A5 WTC

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Drawing Title: **REPORT ON INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT: RAMSAR SITES**

DMRB HEADWALL SCHEMATICS

Figure No: **Figure 10**

Version: A

Appendix 2: Culvert Information

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Table A2.1 Salmonid Potential, Watercourse Identification and Crossing Designs

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
New Buildings Stream	S1-PC-01	Y	Box	1.8 x 2.7	540
UD_01	S1-PC-02	N	Box	2.1 x 2.1	1330
Gortin Hall Drain	S1-PC-03	Y	Box	1.8 x 4.5	2485
UD_02	S1-PC-04	N	Pipe	1.5m Ø	3050
UD_02	S1-PC-32	N	Pipe	1.5m Ø	3125
Blackstone Burn	S1-PC-05	Y	Box	2.1 x 3.9	3375
UD_04	S1-PC-37	Y	Box	1.8 x 1.8	3900
UD_04	S1-PC-06	Y	Box	1.8 x 1.8	3900
UD_04	S1-PC-29	Y	Box	1.8 x 1.8	3900
UD_05	S1-PC-07	Y	Box	1.5 x 1.5	5800
UD_05	S1-PC-41	Y	Box	1.5 x 1.5	5800
UD_07	S1-PC-08	Y	Box	2.1 x 3.0	8240
UD_07	S1-PC-38	Y	Box	2.1 x 3.0	8240
Ballydonaghy Drain	S1-PC-09	N	Pipe	1.8m Ø	10900
Ballydonaghy Drain	S1-PC-40	N	Pipe	1.8m Ø	10900
FD_04	S1-PC-10	N	Pipe	1.5m Ø	12600
Strabane Glen Stream	S1-PC-16	Y	Box	2.7 x 3.0	15470
Roundhill Drain	S1-PC-17	N	Box	1.8 x 2.4	15680
FD_13.b	S1-PC-18	N	Pipe	1.8m Ø	16220
Backfence Drain	S1-PC-19	N	Pipe	2.4m Ø	16650

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Nancy Burn	S1-PC-20A	N	Pipe	0.6m Ø	17090
Nancy Burn	S1-PC-20B	N	Pipe	1.2m Ø	17090
Nancy Burn	S1-PC-20C	N	Pipe	0.6m Ø	17090
Nancy Burn	S1-PC-33	N	Box	2.4 x 3.9	17090
Nancy Burn	S1-PC-42	N	Box	2.4 x 3.9	17090
Park Road Drain	S1-PC-22	N	Pipe	1.5m Ø	17380
UD_08	S1-PC-23	N	Pipe	1.8m Ø	18180
Urney Road Drain	S1-PC-24	N	Box	2.4 x 2.4	18720
UD_10	S1-PC-25	Y	Pipe	1.8m Ø	19230
Flushtown	S1-PC-27	Y	Box	2.1 x 3.6	20900
UD_12	S1-PC-28	Y	Box	2.1 x 2.1	21990
UD_13.1	S2-PC-54	N	Pipe	0.6m Ø	28100
UD_15	S2-PC-01	Y	Open Span	2.4 x 5.4	29800
UD_16	S2-PC-55	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-48	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-56	N	Pipe	1.2m Ø	30150
UD_16	S2-PC-58	N	Pipe	1.2m Ø	30150
UD_17	S2-PC-02	Y	Box	1.8 x 2.7	30820
UD_19	S2-PC-03	Y	Box	2.1 x 3.3	31500
UD_19	S2-PC-49	Y	Box	2.4 x 3.6	31500

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Scotts Mill Layde	S2-PC-07	N	Pipe	1.5m Ø	37500
UD_21	S2-PC-08	N	Box	1.2 x 2.1	38250
Back Burn (UD_22)	S2-PC-09	Y	Box	1.8 x 1.8	39250
Back Burn (UD_22)	S2-PC-60	Y	Box	1.8 x 1.8	39250
UD_23	S2-PC-10	Y	Box	1.8 x 1.8	40600
UD_24	S2-PC-11	N	Pipe	1.8m Ø	41250
UD_26	S2-PC-12	Y	Open Span	1.8 x 3.3	41850
UD_28	S2-PC-13	Y	Box	1.2 x 1.2	42600
UD_29	S2-PC-14	Y	Box	1.2 x 1.5	42850
UD_31	S2-PC-16	Y	Box	1.5 x 1.5	43150
UD_32	S2-PC-17	Y	Box	1.8 x 2.4	43370
UD_33	S2-PC-18	Y	Box	1.5 x 1.5	43780
UD_34	S2-PC-19	N	Pipe	1.2m Ø	43950
UD_35a	S2-PC-50	Y	Box	1.2 x 1.2	44200
UD_36	S2-PC-20	Y	Box	1.5 x 1.8	44500
UD_37	S2-PC-21	N	Box	2.1 x 3.0	46200
UD_39	S2-PC-22	Y	Box	1.8 x 3.0	46440
UD_40	S2-PC-47	Y	Box	2.1 x 2.1	47300
UD_43.1	S2-PC-59	Y	Box	2.1 x 2.1	47300
UD_45	S2-PC-26	Y	Box	1.5 x 1.5	48890

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Tully Drain	S2-PC-27	Y	Box	3.9 x 5.1	48950
Tully Drain	S2-PC-53	Y	Box	3.9 x 5.1	48950
Tully Drain	S2-PC-28	Y	Box	3.9 x 5.1	48950
Aghnamoyle Drain	S2-PC-29	N	Box	4.5 x 5.1	51025
UD_52	S2-PC-32	Y	Box	1.2 x 1.2	53200
UD_54	S2-PC-34	Y	Box	1.5 x 1.5	53700
UD_54	S2-PC-51	Y	Box	1.5 x 1.5	53700
Fireagh Drain	S2-PC-57	Y	Box	2.1 x 3.0	53900
Fireagh Drain	S2-PC-36	Y	Box	2.1 x 3.0	53900
UD_55	S2-PC-38	N	Pipe	1.5m Ø	54320
UD_56	S2-PC-39	N	Box	1.5 x 1.5	55250
Loughmuck	S2-PC-43	N	Box	1.8 x 1.8	56000
Loughmuck	S2-PC-44	N	Box	1.8 x 2.4	56000
Freughmore Drain	S2-PC-45	Y	Box	2.4 x 2.4	57300
UD_57.3	S3-PC-84	Y	Box	1.8 x 1.8	61850
UD_57.2	S3-PC-56	Y	Box	1.8 x 1.8	61850
UD_58	S3-PC-51	N	Box	1.5 x 3.0	62550
UD_109	S3-PC-52	Y	Box	2.1 x 2.1	64080
Ranelly Drain_0.5	S3-PC-53	Y	Box	2.7 x 3.3	64390
Ranelly Drain_0.5	S3-PC-74	Y	Box	2.7 x 3.3	64390
Ranelly Drain_0.5	S3-PC-82	Y	Box	2.7 x 4.2	64390

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
Ranelly Drain 1	S3-PC-06	Y	Box	2.7 x 3.0	64980
Ranelly Drain 2	S3-PC-07	Y	Box	2.4 x 2.7	65650
Ranelly Drain 2.1	S3-PC-08	Y	Box	2.1 x 5.1	65650
Ranelly Drain 3	S3-PC-10	Y	Box	2.1 x 2.7	65650
UD_60	S3-PC-11	N	Box	1.8 x 1.8	66870
UD_61	S3-PC-12	Y	Pipe	1.5m Ø	67650
Letfern (UD_61.2)	S3-PC-14	Y	Box	2.1 x 3.6	68650
Letfern (UD_61.2)	S3-PC-58	Y	Box	2.1 x 3.6	68650
Letfern (UD_61.2)	S3-PC-15	Y	Box	1.5 x 1.5	68650
Letfern (UD_61.2)	S3-PC-66	Y	Box	1.5 x 1.5	68650
UD_62	S3-PC-16	N	Pipe	2.4m Ø	69700
UD_63	S3-PC-17	N	Box	1.8 x 1.8	69700
UD_65	S3-PC-18	N	Box	1.5 x 2.7	70200
UD_67A	S3-PC-83	Y	Box	1.8 x 1.8	71100
UD_67A	S3-PC-50	Y	Box	1.8 x 1.8	71100
UD_67	S3-PC-19	Y	Box	1.8 x 1.8	71100
UD_68	S3-PC-21	Y	Box	1.8 x 1.8	72090
UD_69	S3-PC-22	Y	Box	1.8 x 1.8	72380
UD_71	S3-PC-23	Y	Box	2.1 x 2.7	73770
UD_72.2	S3-PC-64	Y	Box	2.4 x 3.0	74100
UD_72	S3-PC-65	Y	Box	2.4 x 3.0	74100

Watercourse	Culvert ID	Salmonid Potential (Y/N)	Culvert Design	Dimensions *(See Note 1)*	Approx. Chainage (m)
UD_110.3	S3-PC-72	Y	Box	3.3 x 3.3	74100
UD_110	S3-PC-54	Y	Box	2.1 x 2.4	74100
UD_110	S3-PC-60	Y	Box	2.1 x 2.4	74100
UD_75.3	S3-PC-55	Y	Box	1.8 x 1.8	77000
UD_76	S3-PC-29	Y	Box	2.1 x 2.1	78210

Notes:

1. Culvert embedment depths within watercourses with salmonid interest is 350mm (as agreed with Loughs Agency), for all other watercourses the culvert embedment depth should be 150mm.
2. Some watercourses with no salmonid potential recorded and/or agreed with Loughs Agency require box culverts for flood management proposes.

Appendix 3 – Watercourse Diversion Information

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Table A3.1 Watercourse Diversions

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
New Buildings Stream	Y	S1-WD-17	S1-PC-01	540
UD_01	N	S1-WD-01	S1-PC-02	1330
Gortin Hall Drain	Y	S1-WD-16	S1-PC-03	2485
UD_02	N	S1-WD-02	S1-PC-04 & 32	3050
Blackstone Burn	Y	S1-WD-03	S1-PC-05	3375
UD_04	Y	S1-WD-05	S1-PC-06, 29 & 37	3900
UD_05	Y	S1-WD-06	S1-PC-07 & 41	5800
UD_07	Y	S1-WD-07	S1-PC-08 & 38	8240
Ballydonaghy Drain	N	S1-WD-08	S1-PC-09 & 40	10900
UD_08	N	S1-WD-18	S1-PC-23	18180
Urney Road Drain	N	S1-WD-14	S1-PC-24	18720
UD_12	Y	S1-WD-19	S1-PC-28	21990
UD_15	Y	S2-WD-43	None	29800
UD_15	Y	S2-WD-01	S2-PC-01	29900
UD_19	Y	S2-WD-33	S2-PC-03 & 049	31500
Scotts Mill Layde	N	S2-WD-05	S2-PC-07	37500
UD_21	N	S2-WD-34	S2-PC-08	38250
UD_23	Y	S2-WD-08	S2-PC-10	40600
UD_25	N	S2-WD-35	None	41590
UD_26	Y	S2-WD-09	S2-PC-12	41850
UD_28	Y	S2-WD-10	S2-PC-13	42600
UD_29	Y	S2-WD-36	S2-PC-14	42850
UD_31	Y	S2-WD-41	S2-PC-16	43150
UD_32	Y	S2-WD-42	S2-PC-17	43370

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_33	Y	S2-WD-37	S2-PC-18	43780
UD_34	N	S2-WD-38	S2-PC-19	43950
UD_35.1	Y	S2-WD-11	S2-PC-50	44200
UD_36	Y	S2-WD-13	S2-PC-20	44500
UD_37	N	S2-WD-14	S2-PC-21	46200
UD_38	Y	S2-WD-15	None	46440
UD_40	Y	S2-WD-16	S2-PC-47	47300
UD_42	Y	S2-WD-18	None	47300
UD_45	Y	S2-WD-19	S2-PC-26	48890
Tully Drain	Y	S2-WD-39	S2-PC-27, 53 & 28	48950
Tully Drain	Y	S2-WD-20	None	498950
Fairy Water	Y	S2-WD-21	None	50135
UD_50	Y	S2-WD-25	None	52700
UD_52	Y	S2-WD-40	S2-PC-32	53200
UD_54	Y	S2-WD-26	S2-PC-34 & 51	53700
Fireagh Drain	Y	S2-WD-27	S2-PC-36 & 57	53900
UD_55	N	S2-WD-28	S2-PC-38	54200
UD_56	N	S2-WD-29	S2-PC-39	55250
Loughmuck	N	S2-WD-30	S2-PC-43 & 44	56000
Freughmore Drain	Y	S2-WD-31	S2-PC-45	57300
UD_57.3	Y	S3-WD-32	S3-PC-84	61850
UD_57.2	Y	S3-WD-66	S3-PC-56	61850
UD_58	N	S3-WD-43	None	62550
UD_108	N	S3-WD-44	None	62650
UD_108	N	S3-WD-70	None	62550

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_109	Y	S3-WD-45	S3-PC-52	64080
Ranelly Drain 0.5	Y	S3-WD-46	S3-PC-53, 74 & 82	64390
UD_119	Y	S3-WD-04	None	64980
Ranelly Drain 1	Y	S3-WD-05	S3-PC-06	64980
Ranelly Drain 2	Y	S3-WD-06	S3-PC-07	65650
Ranelly Drain 2.1	Y	S3-WD-07	S3-PC-08	65650
Ranelly Drain 2.3	Y	S3-WD-08	None	65650
Ranelly Drain 3	Y	S3-WD-09	S3-PC-10	65650
Ranelly Drain 3.1	Y	S3-WD-10	None	65650
UD_60	N	S3-WD-75	S3-PC-11	66700
UD_61	Y	S3-WD-11	S3-PC-12	67650
Letfern (UD_61.2)	Y	S3-WD-47	S3-PC-15 & 66	68650
Letfern (UD_61.2)	Y	S3-WD-12	S3-PC-14	68650
Letfern (UD_61.2)	Y	S3-WD-48	S3-PC-58	68650
UD_62	N	S3-WD-13	S3-PC-16	69700
UD_63	N	S3-WD-14	S3-PC-17	69700
UD_65	N	S3-WD-16	S3-PC-18	70200
UD_66	Y	S3-WD-17	None	70200
UD_67A	Y	S3-WD-18	S3-PC-50 & 83	71100
UD_67	Y	S3-WD-19	S3-PC-19	71100
UD_68	Y	S3-WD-20	S3-PC-21	72090
UD_69	Y	S3-WD-21	S3-PC-22	72380
UD_70	Y	S3-WD-22	None	73000
UD_71	Y	S3-WD-49	S3-PC-23	73770
UD_110.3	Y	S3-WD-51	S3-PC-72	74900

Watercourse	Salmonid Interest (Y/N)	Diversion ID	Associated Culvert	Approximate Chainage (m)
UD_110	Y	S3-WD-50	S3-PC-54 & 60	74900
UD_113.1	Y	S3-WD-53	None	76950
UD_75.3	Y	S3-WD-54	S3-PC-55	77000

Appendix 4: Outfall Information

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Table A4.1 Summary of Individual HAWRAT, EQS and Downstream 'In-River' Sediment Assessment Results

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S1 OF 01.1	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 02.1A	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 2.1B	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 25	6.5	Y	Wet/Retention Pond	Pass	Pass	Pass	n/a	1	0.22	Pass	0.77	Pass	7	Pass
S1 OF 40	2	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.22	Pass	0.75	Pass	3	Pass
S1 OF 26.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.21	-	0.28	Pass	0.84	Pass	7	Pass
S1 OF 05.2	7	Y	Swales/Grassed Channels & Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.61	Pass	2.16	Pass	7	Pass
S1 OF 07.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.65	Pass	2.28	Pass	9	Pass
S1 OF 08.1	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.15	Pass	0.52	Pass	7	Pass
S1 OF 10.2	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.21	Pass	0.75	Pass	7	Pass
S1 OF 11.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.08	3	0.00	Pass	0.01	Pass	4	Pass
S1 OF 12.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.07	1	0.00	Pass	0.00	Pass	4	Pass
S1 OF 13.1	3.5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.07	2	0.00	Pass	0.00	Pass	4	Pass
S1 OF 42.1	7	Y	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	53	0.43	Pass	1.51	Pass	8	Pass
S1 OF 15.1	5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S1 OF 16.2	5	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass
S1 OF 17.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	53	0.16	Pass	0.57	Pass	10	Pass
S1 OF 27.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.38	Pass	1.35	Pass	9	Pass
S1 OF 27A	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.12	Pass	0.41	Pass	8	Pass
S1 OF 29.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.18	Pass	0.62	Pass	8	Pass
S1 OF 39	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.09	33	0.24	Pass	0.86	Pass	8	Pass
S1 OF 31.1	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.08	37	0.53	Pass	1.86	Pass	9	Pass
S1 OF 32.1	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.07	14	0.25	Pass	0.89	Pass	7	Pass
S1 OF 33.1	7	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	14	0.32	Pass	1.15	Pass	7	Pass
S1 OF 34.1	7	N	Dry/Detention Pond & Wet/Retention Pond	Pass	Pass	Pass	0.04	53	0.85	Pass	3.01	Pass	9	Pass
S1 OF 36.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	3	0.00	Pass	0.00	Pass	7	Pass
S1 OF 37.1	7	Y	Swales/Grassed Channels	Pass	Pass	Pass	0.03	-	0.00	Pass	0.00	Pass	7	Pass
S1 OF 41	7	Y	Swales/Grassed Channels	Pass	Pass	Pass	0.03	1	0.00	Pass	0.00	Pass	7	Pass
S1 OF 22.2	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	3	0.00	Pass	0.00	Pass	7	Pass
S1 OF 23.1	9.6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.03	90	0.81	Pass	2.85	Pass	13	Pass
S1 OF 38	9.6	Y	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.13	9	0.26	Pass	0.9	Pass	10	Pass
S1 OF 24.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.74	Pass	2.61	Pass	12	Pass
S2 OF 01	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.81	Pass	2.87	Pass	11	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S2 OF 02	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.27	-	0.1	Pass	0.54	Pass	7	Pass
S2 OF 03	6	Y	Swales/Grassed Channels & Wet/Retention Pond	Pass	Pass	Pass	0.14	-	0.42	Pass	1.47	Pass	6	Pass
S2 OF 04	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.21	-	0.35	Pass	1.23	Pass	8	Pass
S2 OF 05	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.02	5	0.00	Pass	0.00	Pass	6	Pass
S2 OF 06	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	5	0.00	Pass	0.00	Pass	6	Pass
S2 OF 08.1	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	19	0.02	Pass	0.08	Pass	6	Pass
S2 OF 09	8	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.04	41	0.48	Pass	1.7	Pass	9	Pass
S2 OF 10	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.38	-	0.31	Pass	1.08	Pass	10	Pass
S2 OF 33	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.3	Pass	1.04	Pass	9	Pass
S2 OF 34	7	N	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.6	Pass	2.09	Pass	9	Pass
S2 OF 11	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.4	-	0.16	Pass	0.57	Pass	8	Pass
S2 OF 13	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.66	Pass	2.32	Pass	13	Pass
S2 OF 35	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.34	-	0.7	Pass	2.47	Pass	19	Pass
S2 OF 39	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.87	Pass	3.08	Pass	19	Pass
S2 OF 18	9	N	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.33	Pass	1.17	Pass	11	Pass
S2 OF 19	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.33	Pass	1.16	Pass	10	Pass
S2 OF 21.1	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.25	Pass	0.88	Pass	11	Pass
S2 OF 22	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.13	Pass	0.46	Pass	11	Pass
S2 OF 23.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	5	0.00	Pass	0.01	Pass	9	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S2 OF 41.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.06	3	0.00	Pass	0.01	Pass	9	Pass
S2 OF 24	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.01	23	0.06	Pass	0.2	Pass	10	Pass
S2 OF 25.1	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.12	-	1.32	Pass	0.38	Pass	10	Pass
S2 OF 27	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.15	-	0.12	Pass	0.43	Pass	10	Pass
S2 OF 29	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.17	-	0.37	Pass	1.29	Pass	11	Pass
S2 OF 37	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.09	64	0.57	Pass	1.99	Pass	13	Pass
S2 OF 38.1	10	N	Wet/Retention Pond	Pass	Pass	Pass	0.09	34	0.29	Pass	1.03	Pass	11	Pass
S2 OF 30	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	3	0.00	Pass	0.00	Pass	7	Pass
S2 OF 31.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.04	2	0.00	Pass	0.00	Pass	7	Pass
S2 OF 32	10	Y	Wet/Retention Pond	Pass	Pass	Pass	0.24	-	0.24	Pass	0.84	Pass	11	Pass
S3 OF 21	8	N	Wet/Retention Pond	Pass	Pass	Pass	0.11	-	0.73	Pass	2.58	Pass	12	Pass
S3 OF 02.1	8	Y	Dry/Detention Pond	Pass	Pass	Pass	0.20	-	0.19	Pass	0.57	Pass	9	Pass
S3 OF 22.2	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.34	-	0.22	Pass	0.76	Pass	9	Pass
S3 OF 03.3	8	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.75	Pass	2.65	Pass	20	Pass
S3 OF 04.1	8	N	Wet/Retention Pond	Pass	Pass	Pass	0.1	-	0.71	Pass	2.50	Pass	11	Pass
S3 OF 05.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.22	-	0.13	Pass	0.45	Pass	9	Pass
S3 OF 06.1	7	N	Swales/Grassed Channels & Wet/ Retention Pond	Pass	Pass	Pass	0.13	-	0.52	Pass	1.82	Pass	7	Pass
S3 OF 23.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.29	Pass	1.02	Pass	10	Pass
S3 OF 07	6	Y	Wet/Retention Pond	Pass	Pass	Pass	0.42	-	0.02	Pass	0.7	Pass	6	Pass

Outfall ID	Background TSS level mg/l	Salmonid Interest Y/N	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
									Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
				Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass / Fail
S3 OF 24.1	7	Y	Wet/Retention Pond	Pass	Pass	Pass	0.22	-	0.42	Pass	1.47	Pass	9	Pass
S3 OF 08.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.13	-	0.7	Pass	2.48	Pass	16	Pass
S3 OF 09.1	9	Y	Wet/Retention Pond	Pass	Pass	Pass	0.16	-	0.35	Pass	1.23	Pass	10	Pass
S3 OF 10	*9*	*Y*	*Wet/Retention Pond*	*Pass*	*Pass*	*Pass*	*0.12*	-	*0.17*	*Pass*	*0.6*	*Pass*	*10*	*Pass*

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)

Note: The mitigation noted in column 4 of the table above is provided for water quality purposes, many of the ponds will also have flow attenuation designed into them as required.

Table A4.2 Summary of Cumulative HAWRAT & EQS Assessment Results

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S1 OF 01.1 S1 OF 02.1A S1 OF 02.1B	3 x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.00	Pass	7	Pass
S1 OF 02.1A S1 OF 02.1B S1 OF 25	3 x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.00	Pass	7	Pass
S1 OF 11.1 S1 OF 12.1 S1 OF 13.1	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.01	Pass	4	Pass
S1 OF 12.1 S1 OF 13.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.7	3	0.00	Pass	0.01	Pass	4	Pass
S1 OF 15.1 S1 OF 16.2	2x Wet/Retention Pond	Pass	Pass	Pass	0.2	-	0.00	Pass	0.01	Pass	5	Pass
S1 OF 17.1 S1 OF 27.1 S1 OF 27A	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.55	Pass	1.93	Pass	10	Pass

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S1 OF 27.1 S1 OF 27A S1 OF 29.1	3x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.56	Pass	1.96	Pass	10	Pass
S1 OF 33.1 S1 OF 34.1	Swales/Grassed Channels 2x Wet/Retention Pond Dry/Detention Pond	Pass	Pass	Pass	0.04	66	0.91	Pass	3.25	Pass	9	Pass
S1 OF 22.2 S1 OF 41 S1 OF 37.1 S1 OF 36.1	2x Wet/Retention Pond, 2x Swales/ Grassed Channels	Pass	Pass	n/a	n/a	n/a	0.00	Pass	0.01	Pass	7	Pass
S1 OF 23.1 S1 OF 38	2 x Wet/Retention Pond & Swales/Grassed Channels	Pass	Pass	Pass	0.03	99	0.86	Pass	3.04	Pass	13	Pass
S2 OF 05 S2 OF 06	2x Wet/Retention Pond	Pass	Pass	Pass	0.02	10	0.00	Pass	0.01	Pass	6	Pass
S2 OF 21.1 S2 OF 22	2x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.34	Pass	1.2	Pass	12	Pass
S2 OF 23.1 S2 OF 41.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.06	8	0.01	Pass	0.02	Pass	9	Pass

Outfall ID	Mitigation	HAWRAT Acute Impact Assessment		HAWRAT Chronic Impact Assessment			EQS Assessment				Downstream River Sediment	
							Annual Average Dissolved Copper		Annual Average Dissolved Zinc			
		Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (µg/l)	Pass / Fail	Value (µg/l)	Pass / Fail	Value (mg/l)	Pass/Fail
S2 OF 24 S2 OF 25.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.12	-	0.41	Pass	1.44	Pass	11	Pass
S2 OF 29 S2 OF 27	2x Wet/Retention Pond	Pass	Pass	Pass	n/a	n/a	0.44	Pass	1.55	Pass	12	Pass
S2 OF 30 S2 OF 31.1	2x Wet/Retention Pond	Pass	Pass	Pass	0.04	5	0.01	Pass	0.04	Pass	7	Pass
S3 OF 10 S3 OF 09.1	2x Wet/Retention Pond	Pass	Pass	n/a	n/a	n/a	0.46	Pass	1.61	Pass	11	Pass

Outfall discharges directly to SAC designated watercourse

Outfall discharges upstream of SAC designated watercourse(s)

Note: The mitigation noted in column 4 of the table above is provided for water quality purposes, many of the ponds will also have flow attenuation designed into them as required.

Appendix 5: Draft Construction Environmental Management Plan (CEMP)

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A5 Western Transport Corridor

Draft Construction Environmental Management Plan (CEMP)

November 2017

Produced for

Department for Infrastructure

Prepared by

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CONTENTS

GLOSSARY OF TERMS AND ABBREVIATIONS

A5WTC	A5 Western Transport Corridor
CEMP	Construction Environmental Management Plan
CEEQUAL	The Civil Engineering Environmental Assessment and Awards Scheme
COSHH	The Control of Substances Hazardous to Health Regulations
DRD	The Department for Regional Development
ECoW	Ecological Clerk of Works
EM	Environmental Manager
ES	Environmental Statement
HSEQ	Health, Safety, Environment and Quality Management
MER	Management Environmental Representative
NIEA	Northern Ireland Environment Agency
PMP	Project Management Plan
SWMP	Site Waste Management Plan

1 INTRODUCTION

1.1 Project Summary

The Department for Infrastructure (DfI) Roads is proposing improvements to the A5 Corridor. The proposed scheme includes the construction of 85km of new build road at dual carriageway standard (the A5 Western Transport Corridor (A5WTC)).

The scheme has been divided into three sections for the purposes of delivery, each subject to a separate construction contract.

1.2 Purpose of this Document

Each contractor is required to develop and implement a Construction Environmental Management Plan (CEMP) to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within the Environmental Statement (ES).

It is anticipated that the contractors use this document as the template for their individual CEMP.

Further details specific to the works being undertaken under each of the three construction contracts will be worked up by the Contractors into their CEMP as the scheme progresses.

1.3 Scope of the Construction Environmental Management Plan (CEMP)

This document provides a summary of the generic principles applicable to all three contracts and provides guidance on a consistent approach to ensure that the requirements of the ES are incorporated in the CEMP and within method statements prepared by each of the three Contractors.

The CEMP will document the Contractors' plans to ensure compliance with their legal and contractual obligations as well as implement best practice in construction environmental management.

The CEMP will be applicable to all works associated with the A5WTC scheme including those carried out by sub-contractors.

1.4 Structure of the CEMP

The structure of this guidance document mirrors that anticipated for the section CEMP to be prepared by each of the three Contractors. The contents can be summarised as follows:

- Chapter 1 - Introduction
- Chapter 2 - Training and Induction
- Chapter 3 - Consultation and Communication
- Chapter 4 - Environmental Impacts and Mitigation
- Chapter 5 - Pollution Control and Contingency Plan
- Chapter 6 - Auditing and Monitoring of Environmental Performance
- Annex 1 – Environmental Advice Notes

- Annex 2 – Construction Procedures
- Annex 3 – Construction Information

1.5 Roles and Responsibilities

The Contractor is responsible to ensure that all members of the Project Team, including sub-contractors comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision and instruction to fulfill this requirement.

The Contractor will ensure that all persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified as follows:

1.5.1 Site Manager

The Site Manager's environmental management responsibilities include but are not limited to:

- preparation and implementation of the CEMP;
- close liaison with the Environmental Manager to ensure adequate resources are made available for implementation of the CEMP;
- ensuring that the risk assessments for control of substances hazardous to health regulations (COSHH), noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site; and
- managing the preparation and implementation of method statements. Ensuring that the Environmental Manager reviews all method statements and that relevant environmental protocols are incorporated and appended.

1.5.2 Environmental Manager (EM)

The responsibilities of Environmental Manager include but are not limited to:

- maintaining environmental records;
- providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
- reviewing environmental management content of method statements;
- reporting environmental performance to the Site Manager;
- liaison with statutory and non-statutory bodies and third parties with an environmental interest in the scheme; and
- collection and collation of CEEQUAL evidence.

1.5.3 Engineering Staff

The engineers' environmental management responsibilities include but are not limited to:

- reporting any operations and conditions that deviate from the CEMP to the Site Manager;

- taking an active part in site safety and environmental meetings; and
- ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site.

1.5.4 Supervisors

The supervisors' environmental management responsibilities include but are not limited to:

- ensuring all personnel affected by a method statement are briefed and fully understand its content. Monitor operatives for compliance, including sub-contract operatives;
- implementation of environmental management activities required by the CEMP and works method statements; and
- ensuring that all inspections are carried out as prescribed in the CEMP.

1.5.5 Ecological Clerk of Works (ECoW) (part of the Client's supervisory site staff)

The ECoW will be on site when required to monitor work to ensure that no wildlife or habitat to be retained comes to harm and also to provide advice to site workers regarding best practice. Where the ECoW witnesses work that is not being carried out in accordance with best practice techniques or is causing damage to species or retained habitats, the ECoW will immediately call the Site Manager, Environmental Manager and the NEC Project Manager, and where appropriate stop the activity until corrective action is put in place. ECoW duties include, but are not limited to:

- monitoring site works;
- provision of status reports and updates;
- provision of advice to and liaison with workers on site;
- identifying environmental risks and developing environmental controls – including checks for changes in protected species activity/resting places (badger setts, otter holts etc.);
- delivery of environmental training with the Environmental Manager for site personnel and sub-contractors; and
- liaison with the Site Manager.

1.5.6 Archaeologist

The Archaeologist will be on site when required to monitor excavation works and also to provide advice to site workers regarding best practices. The archaeologist's duties include but are not limited to:

- completion of mitigation works; in the form of targeted trial trenching, archaeological excavation and watching briefs, as required;
- production of detailed method statements to define how archaeological mitigation is sequenced with earthworks operations;
- certification of cleared areas prior to commencement of construction works;
- agreeing areas for topsoil strip or the use of toothless buckets;
- ensuring that all scheduled state care monuments and other known archaeological features requiring protection are demarcated with protective fencing and adequate signage;

- provision of induction training to site teams on archaeological controls;
- providing instructions to the site teams on how and when to access expert advice and opinions; and
- examination of incidental or unexpected finds; and agreeing programmes with the Site Manager for investigation and recording of the archaeological remains.

2 TRAINING AND INDUCTION

2.1 Site Induction

All personnel involved in the Scheme will receive environmental awareness training. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

2.2 Specific Training and Awareness Raising

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor.

Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities.

A register of completed training is to be kept by the Environmental Manager.

The Site Manager will ensure that environmental emergency plans are drawn up and the Environmental Manager will conduct regular checks to ensure that the plan is effective by means of emergency drills.

3 CONSULTATION AND COMMUNICATION

3.1 Statutory and Non-Statutory Bodies

During the construction works, communication will be required with external parties such as, statutory authorities, interest groups and the public. Communication may take the form of scheduled meetings, site visits and written correspondence.

3.2 Public

The Site Manager shall ensure that the public is kept informed of operations that may have an effect upon them. This may involve letter drops and meetings to keep local residents up to date with progress with the scheme and any new operations that are to be carried out. The Site Manager will provide details of contacts within the project team for the public to contact should any issues arise.

3.3 Statutory Consents, Licences and Permits

The provisions for controlling, pumping and discharging water will be agreed with the Northern Ireland Environment Agency (NIEA). The Contractor will ensure that any licences required are in place prior to works commencing.

3.4 Environmental Alerts

Legislative changes or proposed improvements to manage processes on site that have a bearing on the commitments given in the Environmental Statement or other consultations will be communicated by the Site Manager to the Client.

3.5 Meetings and Records

Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate.

4 ENVIRONMENTAL IMPACTS AND MITIGATION

An environmental review of the Scheme has been completed to identify all the commitments and agreements made within the ES and other consultations. From this, a schedule of environmental commitments has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment during the construction phase. Environmental commitments have also been incorporated by the design team into archaeological, ecological, landscape and other relevant designs and specifications.

5 POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Surface Water Run-off, Groundwater and Silt

All operations on site will be carried out in a manner to minimise the production and discharge of silty waters. In particular, where any dewatering has to be carried out an assessment will be made as to the method of disposal of the waters and agreed with the Site Manager.

The management of surface water run-off will be defined within the operation specific method statement and risk assessment. This will ensure that the right solution is implemented for each works activity.

5.2 Fuel, Oil and Chemical Spillage

All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.

Storage tank levels will be checked before delivery to prevent overfilling and to ensure that the product is delivered to the correct tank.

The storage of materials in the main compound and work sites will be controlled in such a manner to ensure that materials are not damaged prior to use either through vehicle or people movements or through exposure to the elements.

All fuel, oil and chemicals will be stored on an impervious base within a bunded area and secured. The bund shall have a capacity of 110% of the volume of the products stored within it. All tanks and containers will be kept in a secure compound and be protected from vandalism, and will be clearly marked with their contents. Stores shall be located at least 10 metres from any watercourse.

All mobile plant will be refuelled in a designated area on an impermeable surface and away from drains. In case of any spillages there will be a spill response kit available at each refuelling point and within each machine working within the highway corridor. Where it is impractical to refuel within a bunded area, a drip tray will be available to catch any spills caused by over fuelling.

5.3 Concrete/Mortar Washout

There will be a designated area for the washout of concrete wagons, shoots and mortar bins at each work site. This will be either a lined skip or a pit lined with an impervious membrane to prevent the escape of the alkaline and silty waters entering groundwater or surface water. These pits will be located in areas of low groundwater sensitivity. Excess concrete remaining in the delivery wagon at the end of a pour will be returned to a designated collection area. Once each worksite has been completed any solid concrete in the washout area will be broken out and used either as suitable fill or disposed of to a licensed waste facility.

5.4 Material Storage

Stockpiles should be positioned as far away from sensitive receptors as possible and suitable measures implemented to prevent run off and dispersion if left for any length of time. Any powders

should be stored in sealed bags or silos prior to use. All deliveries of dry powder should be undertaken in a manner to minimise dust emissions.

5.5 Emergency Procedures

A Site Environmental Emergency Plan will be prepared prior to construction and communicated to all members of the project team including sub-contractors and Emergency Services, this plan will include specific Oil/Hydrocarbon spill response measures.

The plan will detail the following controls:

- site drainage controls;
- fuel handling procedures;
- incident notification procedures;
- pollution control equipment requirements;
- procedures for the control of dust and mud;
- protection of aquifer; and
- measures to protect watercourses and wildlife from chemical spills or sediment laden run off.

Responsible staff will be trained in emergency procedures to form an Emergency Team, so that these procedures can be implemented swiftly and effectively. Periodic testing of emergency procedures will be undertaken by the Site Manager. The Environmental Manager will observe the test and to report on results. Any corrective actions are taken forward for review and approval.

Should an emergency incident occur, the Environmental Manager will be notified immediately. The emergency response will be co-ordinated by the Site Manager. Protective measures, mitigation, clean up and remediation actions will be identified from the evaluation and shall be put into place, having regard for the sensitivities of the environment. A record of the emergency incident will be kept to show the nature of the corrective action undertaken.

6 ENVIRONMENTAL PERFORMANCE MANAGEMENT

6.1 Environmental Risk Register

The Environmental Manager will prepare and maintain an Environmental Risk Register having regard for legal requirements, project environmental commitments the potential for aspects of works to cause significant environmental impact.

The Environmental Manager will record responsibilities assigned for actions required for mitigation and control of the environmental risks in the Environmental Risk Register.

The Environmental Risk Register will be subject to regular review by the Environmental Manager together with the ECoW and Site Manager.

6.2 Consents and Exemptions

The Scheme will require consents and exemptions from various regulatory bodies in advance of construction activities. Copies of legal consents, permits, assents and licences of exemptions obtained will be held in the site environmental file by the Environmental Manager.

6.3 Method Statements and Risk Assessments

Specific environmental risks will be assessed during preparation of method statements. Actions and environmental constraints associated with specific construction operations will be included in method statements, field control sheets and activity plans where appropriate. Generic environmental requirements will be included in all method statements.

6.4 Inspections

Routine inspections to check that pollution control measures are in place will be undertaken by the Environmental Manager, who will produce weekly inspection reports.

Daily inspections will be made by the supervisors during each shift and any environmental problems or risks that are identified will be actioned as soon as is reasonably practicable. Any issues arising from the daily inspections will be notified to the Environmental Manager.

6.5 Auditing

A Project HSEQ internal audit schedule will be prepared. This will include: audits of the implementation of the CEMP and audits of sub-contractor and supplier environmental performance by the Environmental Manager.

6.6 CEMP Review Programme

The CEMP is a live document that will be updated by the Contractor and reviewed by the Environmental Manager on a monthly basis.

6.7 Environmental Complaints

The Environmental Manager will ensure that all environmental complaints and concerns will be responded to in 24 hours.

6.8 Notices of Non-Conformance

In instances where the requirements of the CEMP are not upheld a Non-Conformance and Corrective Action Notice will be produced. The Notice will be generated during the inspections conducted by the Supervisors, the Site Manager, Environmental Manager or external third-party audits. The Site Manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

6.9 Complaints Handling

The response to any complaints will be managed by the Site Manager, who will inform the Environmental Manager of any environmental complaints.

A Complaints Register will be maintained to detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover.

6.10 Key Performance Indicators and Objectives

The Contractor will set Environmental Objectives in order to continuously improve environmental performance on the site. The Contractor will set objectives based on each significant environmental impact and they will be reviewed, and revised if necessary, on a monthly basis. Procedures, monitoring requirements and key performance indicators will be measured against achievable targets.

ANNEX 1: ENVIRONMENTAL ADVICE NOTES

Annex 1.1 EAN 001 In-stream Works Timing Restrictions

Table A1.1 Tier One In-stream Works Timing Restrictions

River	Section	Chainage	Structure Ref	Crossing Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category"	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Burn Dennet	1	10500	S1/B06	IC 37261 04308	Atlantic salmon; Brown trout; River/Brook lamprey; European eel.	-	Salmonid River	2a	40	Obviously Modified												
Glenmornan	1	12700	S1/B08	IC 36548 01938	Atlantic salmon; Brown trout; European eel.	-	Salmonid River	1b	31	Significantly Modified												
Mourne River	1	17900	S1/B14	IH 33501 98061	Atlantic salmon; Brown trout; European eel; River/Brook lamprey; Gudgeon.	SAC; ASSI	Salmonid River	1b	16	Severely Modified												
River Finn	1	18700 - 19500	No structure	-	Atlantic salmon; Brown trout; River/Brook lamprey.	SAC; ASSI	Salmonid River	1a		Obviously Modified												
River Derg	2	34330	S2/B07	IH 36387 87669	Atlantic salmon; Brown trout; European eel; Perch; Roach.	SAC; ASSI	Salmonid River	1b	39	Predominantly Unmodified												
Fairy Water	2	50100	S2/B19	IH 43178 74923	Atlantic salmon; Brown trout; Roach; Gudgeon; Pike; Perch.	-	Salmonid River	1b	30	Significantly Modified												
Drumragh	2	56590	S2/B28	IH 45772 69866	Atlantic salmon; Brown trout; River/Brook lamprey.	-	Salmonid River	2a	35	Significantly Modified												
Routing Burn	3	71700	S4/B08.1	IH 51977 61401	Atlantic salmon; Brown trout; European eel; River/Brook lamprey.	-	Salmonid River	1b	74	Pristine/semi-natural												

River	Section	Chainage	Structure Ref	Crossing Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category"	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Blackwater	3	93300 - 93600	No structure	IH 66562 50670	Atlantic salmon; brown trout; lamprey sp.; stone loach; minnow; European eel; gudgeon; and white-clawed crayfish.	-			60	Obviously modified												

Table A1.2 Tier Two In-stream Works Timing Restrictions

River	Section	Chainage	Culvert Ref	Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
Coolaghy Burn	2	36500	S2/B09.1	IH 36344 87548		-	-	2a	54	Significantly Modified												
Fireagh Burn	2	50200	tbc	IH 42541 73990		-	-	2a	-	-												
	2	51100	tbc	IH 42826 72440		-	-	2a	-	-												
	2	52700 - 54400	tbc	IH 43528 71273		-	-	2a	-	-												
Ramelly Drain	3	64500 - 66000	tbc	IH 48567 68806	Atlantic salmon; Brown trout.	-	-	-	33	Obviously Modified	■	■	■	■	■					■	■	■
Letfern	3	68800	tbc	IH 50401 63942		-	-	1b	36	Severely Modified												
River 30	3	73800 - 74700	tbc	IH 53102 60693		-	-	-	-	-												
River 33	3	78200	tbc	IH 56601 57200	Atlantic salmon, Poss. White claw crayfish.	-	-	-	54	Obviously Modified	■	■	■	■	■	■	■			■	■	■
Roughan River	3	81400	tbc	IH 59651 56381	Atlantic salmon; Brown trout; River/Brook lamprey, Poss. White claw crayfish.	-	-	1a	38	Obviously Modified	■	■	■	■	■	■	■			■	■	■
Ballygawley River	3	83800	S3/17.3, S3/17.4, S3/17.5	IH 61926 55769	Brown trout; European eel. Poss. White claw crayfish.	-	-	1a	44	Significantly Modified	■	■	■	■	■	■	■			■	■	■
River 34	3	86400 - 86600	tbc	IH 64093 54758	Poss. White claw crayfish.	-	-	-	46	Predominantly Unmodified	■	■	■	■	■	■	■				■	■
River 35	3	88100	tbc	IH 65514 53984	Poss. White claw crayfish.	-	-	-	-	-	■	■	■	■	■	■	■				■	■
River 36	3	89500	tbc	IH 66760 53553	Poss. White claw crayfish.	-	-	-	67	Predominantly Unmodified	■	■	■	■	■	■	■				■	■

Table A1.3 Tier Three In-stream Works Timing Restrictions

River	Section	Chainage (approx)	Culvert Ref	Grid Ref	Fish present	Designation	FFD Categorisation	WFD Risk Category	HQA	HMS	Working Windows											
											J	F	M	A	M	J	J	A	S	O	N	D
River 1	1	550	tbc	IC 41143 12785		-	-	-	-	-	*											
River 2	1	2500	tbc	IC 39783 11389		-	-	-	74	Significantly Modified	*											
Blackstone Burn	1	3350	tbc	IC 39247 10773		-	-	-	73	Significantly Modified	*											
River 4	1	5850	tbc	IC 37706 08892		-	-	-	-	-	*											
River 5	1	8300	tbc	IC 37324 06483		-	-	-	-	-	*											
River 9	1	tbc	tbc	IH 33492 94493		-	-	-	-	-	*											
River 10	2	29800	tbc	IH 33553 91041		-	-	-	57	Severely Modified	*											
Liscreevaghan Burn	2	31500	tbc	IH 34638 89829		-	-	-	60	Significantly Modified	*											
Back Burn	2	39300	tbc	IH 39779 84955		-	-	-	49	Obviously Modified	*											
River 17	2	40600	tbc	IH 40918 83843		-	-	-	-	-	*											
River 18	2	41300	tbc	IH 41271 83293		-	-	-	-	-	*											
Beltany Burn	2	41900	tbc	IH 41483 82765		-	-	-	-	-	*											
River 20	2	43300	tbc	IH 41653 81476							*											
River 21	2	43500	tbc	IH 41666 81233							*											
River 22	2	44400	tbc	IH 41878 80383		-	-	-	-	-	*											
River 23	2	46300	tbc	IH 42472 78051		-	-	-	71	Significantly Modified	*											
River 25	2	tbc	tbc	IH 41796 77387		-	-	-	-	-	*											
	2	47400	tbc	IH 42577 75694		-	-	-	-	-	*											
River 38	2	56000 - 56400	tbc	IH 45038 69620		-	-	-	-	-	*											
River 27	2	57400	tbc	IH 45999 69314		-	-	-	49	Significantly Modified	*											
River 37	3	89500	tbc	IH 67678 51982	Poss. White claw crayfish.	-	-	-	-	-	[redacted]											[redacted]

Table A1.4 Key for Tier 1, 2, and 3

FFD	Freshwater Fish Directive
WFD	Water Framework Directive
HQA	Habitat Quality Assessment (product from RHS survey)
HMS	Habitat Modification Score (product from RHS survey)

Table A1.5 WFD Risk Categorisation

WFD Risk Category	UKTAG Reporting Category
1. Water bodies at risk of failing to achieve an environmental objective	**(1.a) Water bodies at significant risk** *Note: Identifies water bodies for which consideration of appropriate measures can start as soon as practical*
	(1.b) Water bodies probably at significant risk but for which further information will be needed to make sure this view is correct *Note: Focus for more detailed risk assessments (including, where necessary, further characterisation) aimed at determining whether or not the water bodies in this category are at significant risk in time for the publication of the interim overview of significant water management issues in 2007*
2. Water bodies not at risk of failing to achieve an environmental objective	**(2.a & 2.b) Water bodies not at significant risk on the basis of available information** **(2.a) Water bodies for which confidence in the available information being comprehensive and reliable is low** *Note: Work on these water bodies will be focused on appropriately improving the quality of information on pressures and their likely environmental effects in time for the second pressures and impacts analysis due to be completed in 2013*
	(2.b) Water bodies for which confidence in the available information being comprehensive and reliable is high *Note: Review for the next pressures and impacts analysis report in 2013 to identify any significant changes in the situation*

Annex 1.2 EAN 002 Protected Species Timing Restrictions

Table A1.6 Protected Species Work Timing Restrictions

Species	Section	Chainage	Legal protection	Timing Restriction	Working Windows											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Winter birds	1	5000 - 10500	HRA process	Works will be restricted within 250m of swan or goose activity during October to March inclusive, alongside a watching brief between the chainages specified.	■	■	■							■	■	■
Nesting birds	All	All woody vegetation	WO 85	Woody vegetation clearance September - February			■	■	■	■	■	■				
Nesting Barn owl	All	None found in baseline surveys, but potentially throughout scheme	WO 85	Destruction of existing nests Sep-Feb only; replacement provided up to 1 year in advance of destruction			■	■	■	■	■	■				
Nesting king fishers	All	None found in baseline surveys, but potentially throughout scheme	WO 85	Netting of suitable river banks to prevent summer nesting where necessary			■	■	■	■	■	■				
Otter holts	2	34400 and 50000 confirmed, 17500, 41800 and 71700 likely.	HR 95 & HRA Process	No time restriction on closure, will be dependent upon activity. Licence and creation of artificial holt up to 1 year in advance of holt closure	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
Bat roosts**	1	3250 and 19000 confirmed (more likely during veg clearance).	HR 95	Bat licence and creation of artificial roosts up to one year prior to roost closure (Preferred October - April)					■	■	■	■	■			
Badger setts	All	Main setts: 7200, 7700, 34250, 54750, 79500, 81100, 83500 (A4 link road) (more likely during veg clearance)	WO 85	Badger licence up to one year prior to sett closure (only allowed 1st July – 30th November) creation of alternative sett up to 1 year prior to original's closure	■	■	■	■	■	■				■	■	■
Smooth newt breeding ponds	2	19500	WO 85	Licence required for trapping and relocation of newts up to one year prior to pond destruction (trapping March-August) creation of alternative pond up to 2 years prior to original's destruction	■	■							■	■	■	■
Red Squirrel dreys	3	possible 34400 and 79400-79700	WO 85	No time restriction on destruction, will be dependent upon activity. Licence up to 1 year in advance of drey destruction	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
White clawed crayfish	3	All water courses 78000 - 93000	WO 85	No works affecting stream May-June. Licence may be required for removal of individuals from works area July - October	■	■	■	■	■	■					■	■
Protected flora	1	18000	WO85	Translocation of trees November to Feb			■	■	■	■	■	■	■			

*It will not be possible to locate all breeding sites or resting places prior to vegetation clearance and site construction works. Provision should be made for the unexpected discovery of any of these features.

Bat Roosts** timings only applicable for summer roosts, if maternity or hibernation roosts discovered in update surveys further restrictions will apply.

Table A1.7 Key Indicating Work restrictions

▒	Work Restrictions Dependent Upon Animal Activity
■	Restricted Works
	Recommended Periods for Works

Annex 1.3 EAN 003 Timetables of Ecology Construction Tasks

Table A1.8 Draft Ecology Works Timetable

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
Hedges, woodland and other habitats suitable for nesting birds		vegetation clearance where necessary for 2012 work	vegetation clearance under ecologist supervision, if active nests found clearance cannot go ahead in that location until approved by ecologists	vegetation clearance for 2013 works		vegetation clearance Sep-Feb for 2014 works			
Sch. 8 Protected Plants (requires licence)	update Sch. 8 surveys	Possible translocation dependent upon NIEA licence terms	Set sch. 8 exclusion zones						
Sch. 9 Invasive Species	update Sch. 9 surveys		Set sch. 9 exclusion zones, treatment of areas as required						
Planting			planting around culvert entrances, verges and on exposed earthworks where possible					general scheme planting	
Newts (requires licence)	update ecology surveys (April-May) and construction of 1 x replacement pond		Fencing of newt areas, creation of new hibernacula (April) / trapping and translocation of newts to new pond area and new hibernacula (May-July) / original pond and hibernacula destruction						
Badgers (requires licence)		update badger surveys and sett monitoring				update badger surveys and sett monitoring		update badger surveys and sett monitoring	
	artificial badger sett creation August-Dec 2011 for closure 2012								
	badger sett closure July-Nov incl.								
			installation of measures to maintain badger commuting routes (inc. cover excavations, temp fencing etc)						
			installation of permanent deterrent fencing along scheme boundary and underpasses as required						
Otters (requires licence)	update surveys and otter holt monitoring		otter holt monitoring			otter holt monitoring		otter holt monitoring	

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
		artificial otter holt creation pre October 2011 for closure pre April 2012							
			closure of holts dependent upon activity						
			installation of measures to maintain otter commuting routes (inc. cover excavations, temp fencing etc.)						
			installation of ledges into new culverts during construction to be ready when water courses are diverted						
Bats (requires licence)	update roost surveys								
	artificial roost creation	artificial roost monitoring			artificial roost monitoring		artificial roost monitoring		artificial roost monitoring
		Monitoring for casual summer roost, some trees and buildings destroyed under ecologist supervision							
		Maternity and summer roost closure	Hibernation roost closure	Maternity and summer roost closure					
			installation of measures to maintain bat commuting routes (inc. artificial hedges etc.)						
			scheme planting to involve 'hop overs'						
Aquatic (requires licence)		installation of pollution prevention/sediment traps etc		weekly monitoring of sediment traps					
			trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)		trapping and exclusion of aquatic species from construction areas (July-August)
			instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)		instream works culverting for sensitive water courses (July-August)
Birds	pre-construction update barn owl survey	barn owl nest closure (if required) and construction of artificial nest							
	pre-construction update kingfisher survey	netting of suitable riverbanks for kingfisher							

Species/Task	Jan - Aug 2011	Sep 2011-Feb 2012	March-August 2012	Sep 2012 - Feb 2013	March - Aug 2013	Sep 2013 - Feb 2014	March-August 2014	Sep 2014 - Feb 2015	March - Aug 2015
Supervision / clerk of works		ecologist clerk of works supervision as required							
			ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff		ecologist tool box talks for all construction staff

Table A1.9 Key Draft Ecology Works Timetable

	Recommended Periods for Works
	Action TBC Following Detailed Design

Annex 1.4 EAN 004 Invasive Species Risk Register

Table A1.10 Invasive Species Risk Register

Species to be added to Sch. 9 Wildlife Order 1985	Risk Category	Latin	Habitat Occurrence	Means of Spread	Impacts	Current Range in Co. Tyrone	Confirmed A5 Locations	Control Methods
Knotweed, Japanese		*Fallopia japonica*	Waste ground, river banks and parks.	vegetative fragments in contaminated soil	Forms extensive stands	Widespread throughout Tyrone.	Burn Dennet (chainage) Mourne (chainage), Strabane Nature Reserve. River Derg (NVC ID Area 26).	Attempting to get rid of stands of Japanese knotweed by digging up or cutting the plant rarely succeeds unless combined with herbicide applications. Fragments of the rhizomes or aerial shoots can regenerate, so must be destroyed by burning. Riverside colonies may spread by fragments floating downstream. The Centre for Aquatic Plant Management (CAPM) recommends control by herbicides as the best option. Transport of soil away from the site containing fragments of Japanese knotweed should be avoided; it might introduce the species to uninfected sites.
Knotweed, Giant		*Fallopia sachalinensis*	Waste ground, river banks, lakesides, old gardens, etc.	Flowers, rhizomes and vegetative fragments in contaminated soil	Forms extensive stands	Scattered throughout Tyrone.	Burn Dennet	Currently the most effective method of control is repeated spraying with herbicides over a number of years, which gradually reduces the vigour of the plant. This is carried out in early autumn, when the herbicide in thought to have the most impact on the plant. New sites and larger stands may also be sprayed in early summer as well, to stunt the growth before the autumn spraying.
Hogweed, Giant		*Heracleum mantegazzianum*	Along riversides, stream banks, and other damp waste sites. In suitable environments, it can be abundant. It can extend along several miles of river bank.	Seed dispersal via water transportation and in soil adhering to shoes and machinery. Seeds can stay viable for several years.	Poisonous to people and animals	Widespread throughout Tyrone.	Large stands along R. Finn and Mourne confluence near Strabane.	Eradication programmes may vary depending on the degree of infestation. Small numbers can be controlled by digging out the whole individual plant; docking the plant to prevent it flowering will divert reserves to ensuring the plant survives to attempt to flower the following year. It is best to cut the stem at below ground level, to ensure that the rootstock is damaged. Larger numbers can be sprayed, preferably when the plants are actively growing and less than 1m tall, with a glyphosate herbicide (this is the only herbicide which can be used near water). This can be done either as a spot treatment, or using long reach sprays. The monitoring of the treated area for several years is necessary, to find new seedlings. Establishing greensward or reseeding with native plants is also beneficial after initial eradication.
Salmonberry		*Rubus spectabilis*	Country parks, river banks, forestry plantations etc.	This plant spreads rapidly by vigorous suckering from the base. It is likely that it could also be spread by careless disposal of garden waste.	Displaces native species.	Widespread throughout Tyrone.	None confirmed.	With well-established large infestations only physical removal involving cutting or digging up the plants, either by hand or mechanically, is feasible. Herbicide should be applied to remaining stumps.
Balsam, Himalayan		*Impatiens glandulifera.*	River banks and lakesides.	There are no special vectors for long-distance dispersal, although dispersal by water is probable. Local dispersal is by seed from existing colonies.	Displaces native species. Bare patches created in winter when the plant dies back may result in increased riverbank erosion.	Widespread throughout Tyrone.	Scattered along route, particularly along watercourses.	Mechanical control, by repeated cutting or mowing, is an effective control, but plants can regrow if the lower parts are left intact. Regular grazing also suppresses this species. Control by herbicides is effective — for detailed advice on this, see the Centre for Aquatic Plant Management web site (Information Sheet 3: Himalayan Balsam). Herbicide should be sprayed before flowering.

Species to be added to Sch. 9 Wildlife Order 1985	Risk Category	Latin	Habitat Occurrence	Means of Spread	Impacts	Current Range in Co. Tyrone	Confirmed A5 Locations	Control Methods
Waterweeds (all species)		*Elodea* (all species)	Still or slow-flowing, shallow or deep water.	vegetative fragments in water courses	Can impede flow, increase flooding, destroy ecosystem and affect recreation	*E. canadensis* scattered throughout Tyrone. *E. nuttallii* rare in Tyrone.	*E. canadensis* abundant in pond adjacent to River Finn H32509673.	*Elodea canadensis* is now an established part of Ireland's aquatic ecosystems. It provides good habitat for many aquatic invertebrates and cover for young fish and amphibians and food for waterfowl. In the case of excessive growth, physical removal is probably the best option, taking care to dispose of the excess material responsibly (by composting or burning). It can also be controlled by suitable herbicides and there is a biological method of control using grass carp (*Ctenopharyngodon idellav*) which graze the plant. Control of *Elodea nuttalli* is similar although this species is less widespread than *E. canadensis* although it is reported to be increasing across the British Isles whilst *E. canadensis* has declined. This has been linked with generally increasing eutrophication of waters.
Knotweed (all species)		*Fallopia* (all species)	Comments as per *F. japonica* and *F. sachalinensis.* Hybrid between these two spp. - *Fallopia x bohemica. F. baldschuanica* (a climber) rarely becomes established in wild.					
Rhubarb, Giant		*Gunnera tinctoria*	Damp grassland, woodland and shaded areas near water	self-sown and vegetative fragments	Forms extensive stands and may impede stream flow	Rare in Tyrone.	River Derg	Mechanical removal and chemical treatment.
Bluebell, Spanish		*Hyacinthoides hispanica*	Woodlands, parkland and gardens.	bulbs in waste soil	Hybridisation with native species	Rarely naturalised in Tyrone. Hybrid with native species is more common. Native sp. is most widespread.	None confirmed.	The complete removal of Spanish or hybrid bluebells from an extensively contaminated site is probably uneconomic and undesirable. The focus of management should be on prevention of further spread into natural woodland or other natural habitats by the removal of garden escapes as and when discovered.

Table A1.11 Invasive Species Risk Categories

High Risk	
Moderate Risk	
Low Risk	

Annex 1.5 EAN 005 Environmental Consents

Table A1.12 EAN 005 Consents

Licence	Info	Responsibility	Programme	Input Required (input and team)
FEPA **FEPA guidance note information:** **http://www.ni-environment.gov.uk/fepa_guidance_notes.pdf** **Construction Licence Application Form:** **http://www.ni-environment.gov.uk/construction_application.pdf** **the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995:** **http://www.ni-environment.gov.uk/ni_wml_consultation_document.pdf**	WMU has suggested that the construction works may occur within 50 metres of the Mean High Water Spring Tide mark of the tidal section of the River Foyle. Therefore you may require a licence issued under Part II of the Food and Environment Protection Act 1985 (A FEPA Licence). This also applies to proposed pipeline outfalls terminating in the sea. WMU's Marine Assessment and Licensing Team should be contacted to determine if the construction works are within this zone and to determine if an FEPA Licence is required. If the works are within 50 m then a **CONSTRUCTION LICENCE** will be required. Some minor works of construction may be exempt from FEPA licensing, these are listed in the Deposits in the Sea (Exemptions) Order (Northern Ireland), 1995, please find attached link in left hand column.	Contractor	It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted **FOUR MONTHS BEFORE LICENCE IS REQUIRED.** Please find attached link in left hand column. FEPA licences cannot be issued retrospectively. Licences are valid for **12 months.** A separate application must be submitted for each stage of construction work. The application will need to be submitted to the environment and heritage team with the following application fee: • Marine Construction: £175 administration fee. The application fee must be paid **before** the application can be processed.	The following information is required for the construction licence application: Project costs (Project Manager) Environmental Statement; only If the project is subject to a planning application (Environment Team) Description of materials to be deposited (Design Engineers) Method of construction; is needed if the project involves land reclamation (Construction Engineers)
Discharge Consent **Discharge Consent application form:**	The scheme will require discharge consent, issued under the Water (Northern Ireland) order 1999, prior to commencement of any works. Discharge	Contractor	It is recommended that contact of the environment and heritage team Northern Ireland takes place as soon as possible. An application form will need to be submitted **FOUR MONTHS BEFORE LICENCE IS REQUIRED.** Please find attached link in left	The following information is required for the discharge consent licence application: Need to state the nature of the discharge, type amount etc (waste team)

Licence	Info	Responsibility	Programme	Input Required (input and team)
http://www.ni-environment.gov.uk/discharge_consent_gn.pdf **Annex 2 (WO1 – Annex 2 Trade Effluent Discharge, includes site drainage):** **http://www.ni-environment.gov.uk/wo1-annex2-trade-effluent-and-site-drainage.pdf**	consents will also be required for any temporary toilets or wash areas that discharge to the aquatic environment. The scheme is most likely to fall under Annex 2 of the discharge consent application.		hand column. The Department has **four months** from the date on which a valid application is received (or such further period as may be agreed in writing between the applicant and the Department) to determine the application, otherwise it is deemed to have been refused by the department. **Annex 2** (WO1 – Annex 2 Trade Effluent Discharge, includes **site drainage**) should be completed in addition to the main application form. A separate application form and fee must be submitted for each type of effluent discharge. Please find attached link in left hand column.	Site details including site drainage (Engineers) Details of receiving Environment and impacts (Environment Team)
Abstraction /impoundment **Abstraction/Impoundment Application form:** **http://www.ni-environment.gov.uk/licence_abstract_impound_water.pdf**	If the scheme involves abstraction (e.g. dewatering of an excavation) or an impoundment a pool of water formed by a dam or pit) an appropriate abstraction/impoundment license may be required.	Contractor	It is recommended that contact of the Abstraction and Impoundment Licensing Team of WMU takes place as soon as possible. For Impoundment and Abstraction a Comprehensive Application for a Licence to Abstract and/or Impound Water F0002 will be required. Please find attached link in left hand column. The form will **NOT** be required if extraction is below **10m³ per day** (conditions in annex A) Please find attached link in left hand column. With effect from 1st April 2010 the following charges will apply: • A flat rate fee of £135 for all abstraction • applications of 20 cubic metres per day or more. • A fee of £30 for any variations to an existing licence. • For abstractions greater than 100 cubic metres per • day an annual charge may apply	The following information is required for the discharge consent licence application: Proposed and existing abstraction/impoundments of water. Abstraction volume details including volume per day for surface, estuarine or coastal waters and groundwater. Monthly Abstraction Volumes in Cubic Metres (m3) (daily maximum). Information on water storage, land etc. (All from engineers)

ANNEX 2: CONSTRUCTION PROCEDURES

The Contractors and their sub-contractors shall employ the Construction Procedures listed below as a practical means to effect environmental mitigation while working on the project.

Annex 2.1 Procedures Site Clearance

Table A2.13 Procedure for Site Clearance

Procedure for Site Clearance	**CP01**	
	Rev: A	**Date: Nov 2010**
Purpose	To minimise the impacts of site clearance works on ecological habitats and wildlife in the area.	
Responsibility for control	Environmental Manager	
Procedures	Before any work is undertaken the proximity to water bodies and ecologically sensitive features shall be assessed. Whole trees shall be removed by trained operators using mulchers specifically designed for the purpose. As far as possible all woody vegetation shall be removed outside of the bird breeding season (March-August inclusive). Where this is not possible woody vegetation shall be checked prior to removal for active birds nests. If any are found works in that location shall cease until the nest can be confirmed as no longer active. Removal of top soil shall be undertaken in accordance with the soil stripping methods detailed in Procedure CP02. Removal of vegetation or top soil within 20m of a water course shall be carried out under the supervision of the Ecological Clerk of Works. If active birds nests, animal holes of sufficient size to be used by badger or otter, squirrel dreys, or individuals of bat, lizard or newt species are found during vegetation clearance then works in that location shall cease and ecologist advice sought. Removal of trees highlighted as potential bat roosts in the ES or in update surveys shall be undertaken using a 'soft felling' method as detailed in the ES. A licence from NIEA may be required if a roost is confirmed as present. Removal of confirmed bat roosts shall take place under NIEA licence and in accordance with the method detailed in the ES. As the confirmed roosts to be destroyed are summer roosts the licence would probably only be granted between October and February. Removal of vegetation or top soil within 50m of an otter holt or breeding site as highlighted in the ES or update surveys shall be carried out under licence from NIEA. Construction activities that are likely to damage or disturb an active badger sett as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. Closure of badger setts can only be undertaken between July and November Removal of ground flora or top soil within 250m of a newt pond as highlighted in the ES or update surveys shall be carried out in accordance with the specific newt habitat clearance guidance as detailed in the ES.	

Procedure for Site Clearance	CP01	
	Rev: A	Date: Nov 2010
	Removal of ground flora or top soil within or adjacent to a newt pond as highlighted in the ES or update surveys shall be carried out under a licence from NIEA. This licence shall be required for the destruction of a newt pond and most probably only be granted between March and September. Removal of woody vegetation within 30m of an active squirrel drey as highlighted in the ES or update surveys shall be carried out following the methodology detailed in the ES and may require an NIEA licence. Removal of invasive species highlighted within the ES, update surveys or by site contractors shall be carried out under specific invasive species clearance methodology detailed in Environmental Consents (Annex 1.4 of the CEMP).	
Environmental Controls	All necessary, ecological licenses shall be in place prior site clearance start.	
Plant & Equipment	Excavator mounted and purpose built tracked mulchers. Excavator harvesters. Hand strimmers. Chainsaws. Tree climbing equipment.	
Monitoring	The Ecological Clerk of Works shall supervise vegetation removal in ecologically sensitive areas, all sites within 20m of water courses, all sites subject to a licence from NIEA, all vegetation cleared during bird breeding season and be on call during all vegetation clearance works.	
Emergency, preparedness and response	If active birds nests, animal holes of sufficient size to be used by badger or otter, bats or squirrel dreys are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted.	
References	Environmental Statement.	

Annex 2.2 Soil Strip

Table A2.2 Procedure for Soil Strip

Procedure for Soil Strip	CP02	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts on ecological habitats and wildlife in the area during soil stripping. To prevent damage to any archaeological remains discovered during construction. To enable the re-use of topsoil and the re-establishment of vegetation after work is complete.	
Responsibility for control	Environmental Manager	
Procedures	Prior to any topsoil being stripped, the topsoil shall be assessed for suitability for re-use on agricultural land, cut and fill slopes, planted landscape mitigation areas or on any areas of ecological interest. Method statements shall be prepared to identify the locations where the topsoil shall be stripped from, temporarily stockpiled and spread. Topsoil stripped from the area of excavations and the footprint of structural fill embankments shall be stockpiled in locations convenient for re-use once cut and fill slopes and landscape mitigation areas are ready for top soiling. Topsoil deemed suitable for re-use for agricultural regeneration or for shrub planting and other landscape mitigation shall be placed in stockpiles not exceeding 3 metres high. Stockpiles shall be allowed to vegetate to prevent erosion or weathering and shall be located away from drainage ditches. Finished worked slopes that are to be spread with topsoil shall be prepared as the earthworks progress and topsoil shall be spread as early as is practicable.	
Environmental Controls	Where required, Archaeological observers shall be present during the topsoil strip for a watching brief. Topsoil that has been identified as “ecologically interesting” shall be recorded as such within the method statement and shall be stockpiled for reuse in windrows no more than 1.5 metres high by 3 metres wide, shaped to shed water. Silt control measures shall consist of small bunds at the toe of the stockpiles as required. Spraying shall be carried out to prevent the proliferation of weeds.	
Plant & Equipment	Topsoil shall be removed and loaded by a 360° excavator using a toothless bucket to dump trucks for transport to stockpile. A 360° excavator shall handle and shape the topsoil at the stockpile site.	
Monitoring	Daily haulage record sheets used in productivity analysis shall provide a second reference to identify which topsoil is stripped from where and where it was placed.	
Emergency, preparedness and response	If animal holes of sufficient size to be used by badger or otter are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted. If items of potential archaeological value are uncovered then works in that location shall	

Procedure for Soil Strip		CP02	
		Rev: A	Date: Nov 2010
	cease and the Archaeologist shall be contacted.		
References	Environmental Statement.		

Annex 2.3 Earthworks and Drainage

Table A2.3 Procedures for Earthworks and Drainage

Procedure for Earthworks and Drainage	CP03	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts of earthworks on ecological habitats and wildlife in the area. To avoid pollution to water courses. To minimise nuisance to the local community due to deterioration of air quality and the creation of dust, noise and vibration. Minimise the surplus materials arising from earthworks.	
Responsibility for control	Environmental Manager	
Procedures	Landowners and authorities shall be informed in advance of commencement of filling at deposition areas. Bunting poles shall be erected around overhead services. Advance pre-earthworks, temporary drainage and dewatering shall be undertaken as required to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place before commencement of any works and appropriate treatment provided prior to discharge to watercourses. No water shall be allowed to pond on the formation layer. When unsuitable material is encountered this shall be removed in accordance with the Site Waste Management Plan. Method statements shall be prepared setting out procedures to monitor and control dust, noise, vibration and deposition on roads. Haul Roads shall be constructed to enable access to the works and movement of the earthworks through the site and to disposal areas. Temporary stockpiles of excavated earth shall be constructed within the lands made available. Stockpiles shall be shaped to ensure rainfall does not degrade the stored material. Drains shall be installed along the toe of embankments in fill areas. Embankments shall be constructed and graded to allow water to shed off the completed earthworks. Embankments shall be sealed at the end of each working shift to avoid ingress of water. The earthworks material shall be placed and compacted in layers to prevent water ingress and degradation of the material.	
Environmental Controls	Temporary drainage or dewatering shall be in place to prevent ingress of water to the earthworks and discharge away from the earthworks. Discharge licenses shall be in place and appropriate treatment provided prior to discharge to watercourses.	
Plant & Equipment	50t – 70t primary excavators 20t – 30t excavators	

Procedure for Earthworks and Drainage	CP03	
	Rev: A	Date: Nov 2010
	Rock breaking and processing equipment Bulldozers Graders 30t – 40t articulated dump trucks Compaction plant including various rollers Soil stabilisation plant	
Monitoring	Daily physical inspection of the site including; watercourses, haul roads, mechanical state of all plants, shall be undertaken to detect any signs of contamination or disturbance. A programme to monitor watercourses, air quality, dust, noise and vibration shall be in place during the construction phase.	
Emergency, preparedness and response	If animal holes of sufficient size to be used by badger or otter are found during vegetation clearance the works in that location shall cease and the Ecological Clerk of Works shall be contacted. If items of potential archaeological value are uncovered then works in that location shall cease and the Archaeologist shall be contacted. An emergency plan shall be prepared to ensure that any unforeseen release of silty water or other polluted effluents are brought quickly under control and remediated in consultation with the NIEA.	
References	Environmental Statement.	

Annex 2.4 Bridge Construction

Table A2.4 Procedure for Bridge Construction Across the Rivers

Procedure for bridge construction across the rivers	**CP04**	
	Rev: A	**Date: Nov 2010**
Purpose	To minimise the impacts on ecological habitats and wildlife in the area during bridge construction. To minimise noise nuisance. To prevent environmental pollution incidents.	
Responsibility for control	Environmental Manager	
Procedures	**Installing temporary bridges** Bunds shall be constructed to surround the working platforms at a level to prevent floodwaters overtopping. Erosion protection shall be installed to the temporary bridge abutments and lead-in and lead-out edges of the bunds. The bridge shall be assembled in sections on a working platform. A crawler or all terrain mobile crane shall be used to lift the longitudinal truss sections over the river. Cross members between the trusses shall be infilled using a crane. To remove the bridge the reverse process to erection shall be employed. The deck shall be longitudinally sloping to give positive drainage of the deck surface. The water from rain or cleaning operations shall be channelled into the moat areas on the floodplain to be pumped to the discharge area. Solid face ply board panelling shall be installed to the sides of the deck to prevent any material that might fall from the trucks from falling into the river. It shall also stop splash water entering the river. Open flooring decking shall not be used. A maintenance regime for cleaning the deck of the bridge and cleaning the approach ramps to the bridge shall be in place. Regular dust suppression shall be required during dry periods to keep the surface of the haul road damp. **Piling for foundations** Any vibration shall be limited to those agreed with the local authorities. Spoil shall be removed by excavator to keep the work area clear and when necessary the excavator shall load the spoil to transportation for removal. Ground water within the bore displaced during placing of concrete shall be pumped away to a washout facility set up off the flood plain. Any spills of concrete shall be cleared up to avoid the possibility of cement contaminating water from rainfall or washing down of equipment. **Excavation for pier foundations** Prior to commencing the bulk excavation of the cofferdam one or more sump holes shall be excavated to the full depth of the excavation. The cofferdam shall be excavated using an excavator with a perforated bucket.	

Procedure for bridge construction across the rivers	CP04	
	Rev: A	Date: Nov 2010
	Low water table levels shall be maintained inside the cofferdam by pumping. Water from the pumping shall not be discharge back into any watercourse without appropriate attenuation and treatment. **Structure base construction** Prefabrication of formwork shall be undertaken remote from the floodplain and any debris from onsite fixing and fabrication shall be sent in skips for recycling. Dewatering of the cofferdam shall be maintained until the concrete base has been constructed, the piers are constructed to above ground level and the cofferdam has been backfilled. **Deck construction** The sub-deck shall have edge upstands, shall be watertight and shall drain to the moats either side of the river. The sub-deck shall provide a second line of protection to catch debris and liquids that would otherwise reach the river. It shall be designed to deflect objects away from the river to a place where they can be collected and disposed of. Until the permanent deck drainage is installed, measures shall be implemented to ensure run-off water from the deck is collected and piped to the moat area on the floodplain where it shall be pumped to discharge areas following suitable attenuation and treatment.	
Environmental Controls	Method statements shall be prepared for the control of noise and vibration. A 15 M.P.H. speed limit shall be imposed on the haul road across the floodplains and watercourses. This shall reduce the risk of dust contamination and pollution of the river. Equipment shall be selected to minimise noise and where appropriate with built in noise attenuation. Some construction materials will be subject to a COSHH assessment.	
Plant & Equipment	Crawler or all terrain mobile crane. Vibrating hammer/extractor. Breakers or crushing plant. Jack hammering. Crane pitching. Vibrating internal poker Concrete pumps. Vibrating rolling screed. Mechanical scabblers. Blacktop pavers and rollers.	
Monitoring	Drainage treatment areas used to accept dewatering and drainage water shall be subject to regular maintenance and monitoring.	
Emergency, preparedness	An emergency plan shall be prepared to ensure that any unforeseen release of silty water or other polluted effluents are brought under control and remediated in consultation	

Procedure for bridge construction across the rivers		**CP04**	
		Rev: A	**Date: Nov 2010**
and response	with the NIEA.		
References	Environmental Statement.		

Annex 2.5 Blasting

Table A2.5 Procedure for Blasting

Procedure for Blasting	CP05	
	Rev: A	Date: Nov 2010
Purpose	To minimise the impacts on ecological habitats and wildlife in the area from blasting. To avoid pollution to water courses and land. To minimise nuisance to the local community cause by deterioration of air quality and the creation of dust, noise and vibration.	
Responsibility for control	Environmental Manager	
Procedures	An explosives supervisor shall be appointed. A site specific method statement and detailed risk assessment shall be produced prior to any blasting operations taking place. Notice shall be provided to the public informing them of the timing of planned blasts and providing the name, address and telephone number of a contact within the project team, who shall deal with their queries. Method statements shall be prepared to specify arrangements for the monitoring of noise and vibration. Site Rules shall be drawn up to govern shot-firing for rock extraction. These rules shall state how explosives are stored, transported, used and disposed of. Method Statements shall be prepared to specify arrangements for the safety of the workforce and the public. They shall also set down permitted shot-firing times, the determination of danger zones for vibration, warning systems, and arrangements for disposal of surplus explosives and monitoring. The disposal of surplus explosives and packaging shall be carried out in strict accordance with the manufactures or suppliers instructions and guidelines. Where rock is excavated and stored temporarily, stockpiles shall be constructed within the lands made available. No water shall be allowed to pond on the rock surface. PSNI shall be fully involved in the approval and awareness of any activities associated with the use of explosives	
Environmental Controls	Design of blasting methodology to maximize efficiency and reduce the transmission of vibration including appropriate charging based upon site specific regression analysis.	
Plant & Equipment	Rotary drill rig Explosives delivery truck or explosives mixing truck Exploders Circuit Testers Wooden or anti-static plastic hand tools	

Procedure for Blasting	**CP05**	
	Rev: A	**Date: Nov 2010**
Monitoring	A programme to monitor watercourses, air quality, dust, noise and vibration shall be put in place during the construction phase. Continuous vibration meters shall be positioned at receptors adjacent to the site prior to shot-firing.	
Emergency, preparedness and response	The Site Manager shall ensure that emergencies response procedures are in place to cover situations involving injury, unforeseen damage to property and unaccountable loss of explosive materials. These procedures shall clearly identify responsibilities for liaison with Police, Fire and Ambulance forces.	
References	Environmental Statement.	

Annex 2.6 Demolition

Table A2.6 Procedure for Demolition

Procedure for Demolition	CP06	
	Rev: A	Date: Nov 2010
Purpose	To avoid pollution to water courses and land during demolition works. To minimise nuisance to the local community cause by deterioration of air quality and the creation of dust, noise and vibration.	
Responsibility for control	Environmental Manager	
Procedures	A site specific method statement and detailed risk assessment shall be produced prior to commencement of any demolition works. All underground pipes, tanks and services shall be located and marked. All tanks shall be labelled with their content and capacity. Visible signs of leaking tanks or pipes and any signs of contaminated ground or groundwater shall be checked. Recyclable waste arisings shall be segregated at source. Asbestos and other hazardous materials shall be separated for safe disposal. Licences shall be obtained from the local environmental health officer before any concrete, masonry or other material is crushed on site. Before removing or perforating tanks, all of their contents and residues shall be emptied for safe disposal by a competent operator in accordance with the Site Waste Management Plan. Pipes shall be capped or valves closed, to prevent spillage. Measures to avoid noise and vibration nuisance shall be agreed with the Local Planning Authority (LPA) and NIEA in advance. A method statement shall be prepared to specify how dust control measures (such as damping down) shall be implemented. All runoff from the site shall be controlled. Discharge licenses shall be in place and appropriate treatment provided prior to discharge to watercourses. Dust shall be prevented from escaping from materials in lorries leaving the site. If it is not possible to cover lorries because there are pieces of protruding material, they shall be sprayed with water just before they leave.	
Environmental Controls	Adequate inspection to plant and equipment in operation shall be carried out prior to demolition works to ensure that noise and vibration levels do not exceed those agreed with the local authorities. Suitable spill response materials and emergency instructions shall be available on site and staff shall have been adequately trained.	
Plant & Equipment	360^0 tracked excavator fitted with breaker Saw fitted with dust suppressant 40 Tonne tracked crawler crane / 80t mobile if necessary	

Procedure for Demolition	**CP06**	
	Rev: A	**Date: Nov 2010**
	Stihl saw Harness and appropriate Personal Protective Equipment (PPE) if necessary	
Monitoring	A programme to monitor air quality, dust, noise and vibration shall be put in place during the construction phase.	
Emergency, preparedness and response	Emergency response plans will be incorporated into the Contractors' method statements for each individual demolition operation.	
References	Environmental Statement.	

The Contractor shall develop these further as an integral part of their operational procedures for issue as Controlled Documents.

ANNEX 3: SITE ACCESS LOCATIONS

Table A3.1 Site Access Locations

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Section 1				
Junction 1 - Existing A5 (Victoria Road)	400	20 per day (240 days)	Directly off existing A5	
Junction 2 - Existing A5 (Victoria Road)	1770	20 per day (240 days)	New Junction 2 link road	
Shared Accommodation Access	2850	20 per day (300 days)	Shared access to treatment works	
Meenagh Road	4900	20 per day (360 days)	"Using existing side road (permanent stop off)"	
Existing A5	6400	20 per day (360 days)	Directly off existing A5	
Donagheady Road	7800	12 per day (240 days)	New Donagheady side road	
Existing A5	9100	20 per day (360 days)	Directly off existing A5	
Existing A5	11600	70 per day (360 days)	Directly off existing A5	
Junction 3	14700	160 per day (480 days)	New Junction 3 link road	Surplus from south of river Mourne & imported fill material.
Existing A5	16700 - 17900	90 per day (480 days)	Directly off existing A5	Surplus from south of river Mourne & imported fill material.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Junction 6 (Existing A5)	18050	50 per day (480 days)	Directly off existing A5	
Strahans Road	20500	200 per day(360 days)	"Using existing side road (improvements required)"	Surplus cut south of river Mourne hauled north via Strahans road.
Orchard Road	21500	15 per day (360 days)	Using existing Orchard road	
Junction 8 – Existing A5 (Melmount Road)	22090	10 per day (240 days)	New Junction 8 link road	
Peacock Road	22300	20 per day (360 days)	"Using existing side road (improvements required)"	
Section 2				
Primrose Park	27215	25 per day (240 days)	From Peacock Road/Ex. A5	Temporary Diversion to north side.
Bells Park Road (B165)	27995	20 per day (240 days)	From Ex. A5	Temporary Diversion to north side. Not required if new alignment is offline from existing.
Garden Road	28000			Assumed Closed until complete with Bells Park Rd.
High Road	28595			
Seein Road	29165	10 per day (120 days)	From Bells Park Rd.	Now offline. Shuttle work (traffic lights) to complete tie-ins.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Concess Road	30140			Short term Road Closures to construct road and beam lifts.
Fyfin Road (B72)	31445	50 per day (360 days)	From B165 & Ex. A5	Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth).
Stone Road	31910			Temporary closure with diversion using realigned Urbalreagh Rd.
Urbalreagh Road (North)	31985	20 per day (360 days)	From B72 Fyfin Rd.	
Urbalreagh Road (South)	31985		From B72 Fyfin Rd.	
Unnamed Road	32600			
Derg Road	33960	20 per day (240 days)	From Ex. A5 onto Old Bridge Rd.	Temp Diversion using existing to south of new realignment.
Deerpark Road (B164)	34725	20 per day (240 days)		Temp Diversion to the north of the new realignment.
Milltown Road	35305			
Magheracoltan Road	36285	20 per day (240 days)	From B164 and B84/Drumlegagh Rd.	Short term Road Closures to construct road and beam lifts.
Drumlegagh Road North	37130	20 per day (240 days)	From Magheracolton Rd to JN2 only.	
Golf Course Road	37280			

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Baronscourt Road (B84)	37290	50 per day (360 days)	From Old A5 Strabane Rd & Ex. A5.	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Oldcastle Road	38625			Temp Diversion to the north of the new realignment.
Honeywell Lane	39000			
New Glen to Old Glen Link	39350			
Glen Road	39305			Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Gortgranagh Road	39500			
Castletown Road (North)	39910	50 per day (360 days)	From Old A5 in Newtownstewart.	Maintain existing road until new overbridge complete.
Grange Road	40050			
West Road	41180			Temp Diversion to the north of the new realignment.
Joe's Lane	42610	25 per day (240 days)	From Ex. A5.	Maintain existing road until new overbridge complete.
Gordon's Lane	43700	50 per day (240 days)		Becomes a shared access track.
Killynure Road	44980			Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (South)	45688	20 per day (360 days)	From Ex. A5	Short term Road Closures to

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				construct road and beam lifts.
Cashty - Castletown link	45750			
Cashty Road	46900			
Dunteige Road	46970	20 per day (360 days)	From Castletown Rd at Mountjoy	Temp Diversion to the north of the new realignment.
Lisnagirr Road	47605	20 per day (480 days)	From Ex. A5.	
Tully Link Road East	48000			
Rash Road	48100	20 per day (240 days)	From Ex. A5.	
Tully Link Road West	48200			
Junction 11 – Drumlegagh Road South	49675	25 per day (360 days)	From Ex. A5.	Shuttle work (traffic lights) to complete tie-ins.
South Drumlegagh Road	49620	25 per day (360 days)	From Ex. A5.	
Todds Road	49890			
Mellon Park Drive	50495			
Armstrong's Lane	50770			
Gillygooly Road (B50)	51255	50 per day (360 days)	From Ex. A5.	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Mullaghmena Road	51255			Temporary Road Closure to construct & finalise to new B50.
Aghnamoyle Road	52145	20 per day (240 days)	From B50 Gillygooley Rd.	Use existing and realigned Botera Road as temporary

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				diversion until Overbridge complete.
Botera Road	52235			
Tamlaght Road	53205	10 per day (240 days)	From Brookmount Rd/ Ex. A5.	Full Road Closure for duration of bridge construction.
Brookmount Road	53825	10 per day (240 days)	From Ex. A5.	Short term Road Closures to construct road and beam lifts.
Juntion 12 - Clannobogan Road (A32)	54145	50 per day (360 days)	From A32	Short term Road Closures to construct road and beam lifts.
Loughmuck Road	54485	20 per day (120 days)	From Dromore Rd/A32	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Beagh Road	55485			
Ballynahatty Road	56530	20 per day (240 days)	From Old A5, Dublin Rd, Omagh	Now mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Blackfort Road	57130	20 per day (120 days)	From Section 3/ B83 Seskinore Rd.	Use existing and realigned Blackfort Road as temporary diversion until Overbridge complete.
Drumragh Road	57300	20 per day (240 days)	From Section 3/ B83	

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
			Seskinore Rd.	
Section 3				
Junction 13 - Seskinore Road (B83)	62065	120 per day (540 days)	Use existing side road	Large quantities of export and import required.
Tattykeel Cottages North	62600	20 per day (360 days)	Use existing side road	
Tattykeel Cottages Central	62850	20 per day (360 days)	Access directly from existing A5	Access to Doogary Bog
Tattykeel Cottages South	63800	20 per day (360 days)	Use existing side road	
Drumconnelly Road 1	64400	70 per day (450 days)	Use existing side road and realigned side road	Large quantities of export and import required.
Tullyrush Road	66000	35 per day (450 days)	Use existing side road with minor upgrade works	
Rarone Road	66900	25 per day (360 days)	Use existing side road with minor upgrade works	
Drumconnolly Road (South)	67900	25 per day (360 days)	Use existing side road with minor upgrade works	
Moylagh Road (B46)	68700	50 per day (450 days)	Use existing side road	Large quantities of export and import required.
Augher Point Road	68800	30 per day (360 days)	Use existing side road and realigned side road	
Greenmount Road	71150	65 per day (450 days)	Use existing side road	Large quantities of export and import required.
Springhill Road	73800	100 per day (720 days)	Use existing side road and temporary road	Large quantities of export and import required. No suitable

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
				alternative access between Springhill and Glenhoy.
Tullanafoile Road	75900	10 per day (200 days)	Use existing side road	
Tullycorker Road	76600	10 per day (200 days)	Use existing side road	
Rarogan Road	78450	10 per day (200 days)	Use existing side road	
Glenhoy Road	80300	100 per day (720 days)	Use existing side road and realigned side road	Large quantities of export and import required. No suitable alternative access between Springhill and Glenhoy.
Ballynasaggart Road	81700	40 per day (720 days)	Use existing side road with minor upgrade works	Large quantities of export and import required.
Feddan Road	83300	10 per day (200 days)	Use existing side road	
Tullybryan Road	83400	20 per day (360 days)	Use existing side road and realigned side road	
A4 Annaghilla Road	83500	100 per day (720 days)	Use existing side road	Large quantities of export and import required.
Tullyvar Road (crosses A4)	N/A	20 per day (360 days)	Use existing side road	
Tullywinny Road (South)	84400	130 per day (540 days)	Use existing side road accessed from Ballynany Road	
Lisginny Road	86500	200 per day (540 days)	Use existing side road with minor upgrade works	Large quantities of export and import required.

Site Access	Mainline Chainage	Average Truck Movements (period)	Access Description	Comments
Old Chapel Road	87800	10 per day (240 days)	Use existing side road	
Existing A5 - Tullyvar Road	88500	160 per day (720 days)	Use existing side road	Large quantities of export and import required.
Carnteel Road (B35)	90300	110 per day (360 days)	Use existing side road and realigned side road	Large quantities of export and import required.
Rehaghy Road (B128)	90800	50 per day (360 days)	Use existing side road and realigned side road	
Caledon Road (A28)	91900	60 per day (360 days)	Use existing side road	
Monaghan Road (stopped up, turning head provided)	93300	30 per day (360 days)	Use existing side road	Large quantities of export and import required.

ANNEX 4: TRAFFIC MANAGEMENT

Table A4.1 Traffic Management Description

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Section 1				
Junction 1 Existing A5 (Victoria Road(	400	No	Yes	One way TM (traffic lights) to complete tie-ins with the existing A5 and the junction changes associated with Woodside Road.
Junction 2 Existing A5 (Victoria Road)	1750	No	Yes	One way TM to complete tie-ins.
Junction 2 Link to A5WTC	1770	No	No	N/A
Dunnalong Road	3900	No	No	Local School bus route. Temporary diversion to the north of the existing road.
Meenagh Road	4900	Yes	Yes	No TM requirements. Landowner access will be maintained during works.
Existing A5 – Victoria Road	6400	No	Yes	Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and only requires the relocation of a bus lay-by to the north of the proposed structure. Night closure required for bridge beam lifts.
				New link road running across the top of the Bready cutting will require TM to complete tie-in.
Cloghboy Road	6400	No	No	Realigned Cloghboy Road constructed offline.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Tamnabrady Road (U1813)	7100	No	No	
Donagheady Road	7800	No	No	No TM requirements. Existing Donagheady Road maintained until new side road / structure completed. One way TM to complete tie-ins.
Willow Road	8900	Yes - in part	No	Realigned Willow Road constructed offline.
Existing A5	9100	No	Yes	Traffic flows will be maintained on existing A5 during bridge construction works. Assumed that A5 remains at grade and requires no upgrade works. Night closure required for bridge beam lifts.
Ash Avenue	9600	Yes	No	Establish Ash / Drumenny link prior to closing Ash Avenue.
Drumenny Road	10000	Yes	No	Traffic will use Ash Avenue during bridge construction works.
Ballydonaghy Road	10900	Yes	No	Temporary diversion to the north of the existing road.
Moss Road	11000	No	No	Traffic will use Ballydonaghy / Moss link during construction.
Greenlaw Road	12900	Yes	No	Establish Park Road / Greenlaw Road link prior to closing Greenlaw Road.
Park Road (north)	13500	No	No	Traffic flows will be maintained on existing Park Road during bridge construction works.
Junction 3 Existing A5 (Victoria Road)	14700	No	Yes	Various local temporary diversions for the realigned existing A5, Woodend Road and Park Road will be required during construction works. One way TM will be required at intervals during construction.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Spruce Road	15000	Yes	No	Early closure, access via. Park Road during construction.
Park Road (south)	17300	Yes (junction)	No	Existing junction with the A5 to be stopped up and diverted through the realigned link through Junction 4.
Greenbrae Park	17400	Yes	No	Road to be closed – no TM required
Lifford Road	17900	No	Yes	Various local temporary diversions will be required during construction works. One way TM may be required at intervals during construction.
Junction 5 Existing A5 (Barnhill Road and Bradley Way)	17680	No	Yes	New arm to be provided on the roundabout for the southbound slip road; TM will be required to complete the tie-in.
Junction 6	17900	No	No	New arm to be provided on the roundabout for the slip roads; TM will be required to complete the tie-in.
Urney Road (B85)	19500	No	No	Realigned offline. One way TM to complete tie-ins.
Carrick Avenue	19600	No	No	Realigned offline. One way TM to complete tie-ins.
Section 2				
Primrose Park	27215	No	Yes - from Sion Mills	Temporary diversion to north side.
				New alignment is offline from existing.
Garden Road	27900	Diverted	No	Assumed closed until complete with Bells Park Road.
B165 Bells Park Road	27995	No	Yes	
High Road	28595	Yes	No	
Seein Road	29165	No	Yes - from Bells Park Road	Offline. Shuttle work (traffic lights) to complete tie-ins.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Concess Road	30140	No	Yes - from Bells Park Road	Short term road closures to construct road and beam lifts.
Fyfin Road (B72)	31445	No	Yes	Shuttle work (traffic lights) to upgrade pavement & markings etc (width/depth).
Stone Road	31910	No	Yes	Temporary closure with diversion using realigned Urbalreagh Road.
Urbalreagh Road (North)	31985	Diverted	Yes	
Urbalreagh Road (South)	31985	Diverted	Yes	
Derg Road	33995	No	Yes - from Ex. A5	Temp diversion using existing to south of new realignment.
Deerpark Road (B164)	34725	No	Yes	Temp diversion to the north of the new realignment.
Milltown Road	35305	Yes	No	
Magheracoltan Road	36285	No	Yes	Short term road closures to construct road and beam lifts.
Drumlegagh Road North	37130	Diverted	Yes	Linked to Junction 10 connector road
Golf Course Road	37280	Yes	Yes	
Baronscourt Road (B84)	37290	No	Yes	Offline. Shuttle work (traffic lights) to complete tie-ins.
Oldcastle Road	38625	No	No	Temp diversion to the north of the new realignment.
Honeywell Lane	39000	Yes	No	
Glen Road	39305	Diverted	Yes	Shuttle work (traffic lights) to complete tie-ins.
Gortgranagh Road	39510	Diverted	No	Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (North)	40060	No	Yes	Maintain existing road until new overbridge complete.
Grange Road	40020	Diverted	No	
West Road	41180	No	No	Temporary diversion to the north of the new realignment
Joe's Lane	42610	Diverted	Yes	Maintain existing road until new overbridge complete.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Gordon's Lane	43700	Yes	Yes	Abandoned between Castletown Road and existing A5. Proposed underbridge (for landowner access) offline to the north.
Killynure Road	44980	No	Yes - from Ex. A5	Mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Castletown Road (South)	45688	No	Yes - from Ex. A5	Short term road closures to construct road and beam lifts.
Cashty	46900	Diverted	Yes	
Dunteige Road	46970	No	Yes	Temp diversion to the north of the new alignment.
Lisnagirr Road	47605	Yes	No	
Tully Road (North)	48100	Diverted	No	
Rash Road	48100	No	Y	Temp diversion via Tully Road (East).
Tully Road (South)	48495	Yes	No	
Drumlegagh Road South	49620	Yes	Yes	Link provided to Junction 11.
Junction 11 – Drumlegagh Road South	49675	-	Yes	Shuttle work (traffic lights) to complete tie-ins.
Todds Road	49890	Yes	No	
Mellon Park Drive	50495	Diverted	Yes	
Gillygooly Road (B50)	51255	No	Yes	Offline. Shuttle work (traffic lights) to complete tie-ins.
Mullaghmena Road	51255	No		Temporary road closure to construct and finalise tie-in to new B50.
Aghnamoyle Road	52145	No	Yes	Use existing and realigned Botera Road as temporary diversion until Overbridge complete.
Botera Road	52235	Diverted	No	
Tamlaght Road	53205	No	Yes	Full road closure for duration of bridge construction.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Brookmount Road	53825	No	Yes	Short term road closures to construct road and beam lifts.
Junction 12 - Clanabogan Road (A32)	54145	No	Yes	Short term road closures to construct road and beam lifts.
Loughmuck Road	54485	No	Yes	Offline to the north. Shuttle work (traffic lights) to complete tie-ins.
Beagh Road	55980	No	Yes	Mostly offline to the south. Partial temp diversion to the north.
Ballynahatty Road	56530	No	Yes	Mostly offline. Shuttle work (traffic lights) to complete tie-ins.
Blackfort Road	57000	No	Yes	Use existing and realigned Drumragh Road as temporary diversion until overbridge complete.
Drumragh Road	57300	Diverted	No	
Section 3				
Junction 13 - Seskinore Road (B83)	62065	Re-aligned	Yes	Temporary road construction for tie-in. Possibly traffic lights for Western tie-in through bog.
Existing A5 - Doogary Road	62100	Re-aligned	Yes	Temporary road construction for tie-ins.
Tattykeel cottages north	62600	Yes	Yes	Road closure agreed, access provided from south.
Tattykeel cottages central	62850	Re-aligned	Yes	Road closure agreed, access provided from south.
Tattykeel cottages south	63800	Yes	Yes	Remains open until central section re-opens.
Drumconnelly Road (North)	64400	Re-aligned	Yes	Short duration closure required to construct tie-in.
Tullyrush Road	66000	No	Yes	Road closure agreed for duration of structure. Diversion via Seskinore Road.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Rarone Road	66900	No	Yes	Road closure agreed for duration of structure. Diversion via Seskinore Road.
Drumconnolly Road (South)	67900	Yes	Yes	Remains open until Rarone Road re-opened.
Moylagh Road (B46)	68700	Re-aligned	Yes	Temporary road required for tie-in.
Augher Point Road	68800	Re-aligned	Yes	Temporary road required for tie-in.
Killadroy Road	70950	Re-aligned	No	Short duration closure required to construct tie-in.
Greenmount Road	71150	Re-aligned	Yes	Short duration closure required for tie-ins, beam lifts access via Kiladroy.
Routingburn Road	72000	Yes	No	
Springhill Road	73800	No	Yes	Temporary road constructed to south.
Cormore Road	75000	Yes	No	
Tullanafoile Road	75850	No	Yes	Road closure agreed. Phased with Tullycorker.
Tullycorker Road	76650	No	Y	Road closure agreed. Phased with Tullanafoile.
Tycanny Road	78200	Re-aligned	N	Short duration road closure required for tie-in.
Rarogan Road	78450	No	Y	Road closure agreed. Phased with Tullycorker.
Glenhoy Road	80200	No	Y	Short duration road closure required for tie-in.
Ballynasaggart Road	81700	No	Y	Road closure agreed. Phased with Crew Road.
Crew Road	82000	Yes	N	Remains open until Ballynasaggart re-opens.
Feddan Road	100 (on A4)	No	Y	Road closure required. Alternative access via Ballynasaggart Road.

Side Road/ Junction	Mainline Chainage	Side Road Stopped Up	Preferred for Import of Materials & all Vehicles	Comments Temporary Diversion / Road Closure
Tullybryan Road	450 (on A4)	No	Y	Online construction. Road closure required.
Junction 15 – Existing A4 Annaghilla Road	83500	No	Y	Online construction. Temporary traffic restrictions (dual to single).
Tullyvar Road (crosses A4)	N/A	No	Y	Temporary road required for construction of embankments.
Ballynany Road	83700	Yes	Y	Road closure required. Phased with Tullywinny.
Tullywinny Road (Tie-In with A4)	N/A	Yes	N	Road closure required.
Tullywinny Road (South)	84400	No	Y	Road closure required. Phased with Ballynany.
Lisginny Road	86500	No	Y	Short duration closure agreed for construction of tie-ins.
Old Chapel Road	87800	No	Y	Road closure required for duration of structure.
Existing A5 - Tullyvar Road	88400	No	Y	Temporary roads required for construction of tie-ins.
Loughans Road	88500	No	N	Road closure required for duration of structure.
Carnteel Road (B35)	90300	No	Y	Temporary roads required for construction of tie-ins.
Rehaghy Road (B128)	90800	No	Y	Short duration closures required for beam lifts, road closures.
Caledon Road (A28)	91900	No	Y	Temporary road required for construction of tie-ins.
Existing A5 - Monaghan Road	93000	Yes	Y	Possibly traffic lights/ temporary road for construction of tie-in.

Appendix 6: Draft Silt Management Plan

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A5 Western Transport Corridor

Draft Silt Management Plan (SMP)

November 2017

Produced for

Department for Infrastructure

Prepared by

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CONTENTS

1. Introduction

1.1.1. This plan sets out site controls for management of sediment generated from over pumping during the construction of the new culverts and precipitation runoff during earthwork operations.

1.1.2. All relevant construction activities for temporary and permanent works will follow relevant environmental legislation in consultation with Northern Ireland Environment Agency (NIEA) and where required, DfI Rivers, Loughs Agency and DAERA, Inland Fisheries. The main objective of the Silt Management Plan is to ensure that all drainage of temporary works is carried out in adherence with current regulation and to provide guidance on how to prevent water pollution.

1.1.3. Various agencies are responsible for control of distinct elements of the works:

- DfI Rivers – proposals do not cause flooding upstream of the works.
- NIEA – discharge of precipitation water, extraction and ecological licenses.
- Loughs Agency – fish within the Foyle Catchment.
- Inland Fisheries – fish within the Blackwater Catchment.

1.1.4. The construction phase of all projects is a period within which there is a significant potential for pollution, in particular silt pollution to local watercourses due to unearthed alluvium. The objective of this plan is to provide guidance on the relevant statutory provisions, including any consents required, in respect of the water environment, to protect both physical habitat and morphology and to avoid unacceptable adverse impacts including changes to flow volume, water levels and water quality due to construction.

1.1.5. This plan aims to address the requirements of the DfI Rivers, NIEA, Loughs Agency and Inland Fisheries and detail the strategy for dealing with these key environmental risks.

1.1.6. A Discharge License will be required from NIEA to enable the works to commence. This licence will be granted for each phase of the works and the works will then be monitored on a month by month basis by the NIEA. Each month contractors will be required to issue a monthly return to the NIEA which will be the projected discharges for the following month. These will be linked to the construction programmes. These plans will be reviewed every three months and updated if required.

1.1.7. Where construction activities near water courses and water bodies are essential, steps have been undertaken to identify sufficient mitigation measures for the protection of the watercourses against pollution. The Silt Management Plan also includes details for

pollution prevention measures and construction methodologies to be incorporated during the construction phase of the project.

1.1.8. Caution is required to prevent pollution and/or environmental damage, particularly when the following activities are undertaken:

- Construction of permanent and temporary bridges.
- Discharges into a surface water drainage system.
- Operating plant or machinery in, or in the vicinity of water.
- Discharges of surface water runoff.
- Laying of pipeline or cable.

2. Silt Management

2.1. Scheme Overview

2.1.1. The proposed A5WTC would be an 85km long dual carriageway, running between New Buildings and the border with the Republic of Ireland (ROI), immediately south of Aughnacloy.

2.1.2. The proposed scheme runs along the Foyle Valley, close to the River Foyle, crossing the Burn Dennet

2.1.3. A full description of the scheme alignment is presented in Appendix A.

2.1.4. The works consist of a number of watercourse crossings which require the construction of new piped or box culverts to carry the streams under the new mainline. An example detailed method statement has been developed to control the construction of these and is included in Appendix B.

2.2. Sensitive Areas

2.2.1. The following areas are considered to be particularly sensitive with respect to potential impacts from pollution which may result from inadequate drainage control:

The River Foyle has a catchment area of approximately 2890km^2 and extends into the counties of Londonderry, Tyrone and Donegal. The major tributaries of the Foyle include the Burn Dennet, Glenmornan, Finn, Mourne, Strule, Owenkillew, Derg, Fairy Water, Camowen and Drumragh Rivers. The northern section of the proposed route lies within the Lower Foyle Catchment, where the Mourne and the Finn converge at Strabane to form the River Foyle. From Strabane the Foyle flows north to Londonderry and Lough Foyle. The lough is tidal and exerts a tidal influence up the River Foyle as far as Strabane. The tidal reach of the Foyle has a tidal range of approximately 3m and is up to 750m wide in places. The main tributaries to the Foyle in the vicinity of the route are discussed in the following paragraphs. However, there are also a significant number of smaller tributaries which the route crosses. These tributaries are generally large man-made field drains and small streams which have been heavily modified / straightened where they pass through villages and agricultural land. The proposed scheme runs along the eastern side of the River Foyle from New Buildings to Strabane, primarily through agricultural land.

The Burn Dennet has a catchment of approximately 150km^2. It rises in the Sperrin Mountains, and flows 35km west to the River Foyle. The catchment is predominantly agricultural, although there are significant sand and gravel quarries close to its lower reaches. The Proposed Scheme crosses the river in the vicinity of Burn Dennet Bridge. Here, the watercourse is approximately 15m wide and typically transitional in character, the valley being relatively unconfined with a wide floodplain and a channel which is relatively

shallow in gradient and meandering in form with riffle/pool sequences.

The Glenmornan River has a catchment of approximately 35km^2. It rises in the foothills of the Sperrins and flows 16km west to the River Foyle passing through the villages of Artigarvan and Ballymagorry. The upper catchment comprises peat covered hills. The landscape of the mid and lower reaches is predominantly agricultural. There are some sand and gravel workings adjacent to the middle reaches of the watercourse. Where the Proposed Scheme crosses the river, north- west of Ballymagorry, the river channel is between 4m and 20m wide and typically transitional in character.

The River Finn rises in Lough Finn in County Donegal and flows east for 60km to Strabane, where it joins with the River Mourne. The upper reaches of the catchment, which has an area of 495km^2, generally flow through mountainous terrain. The route runs along the eastern bank of the lower reaches of the river, which by this point is a mature lowland river, with a wide unconfined valley and floodplain that is relatively deep and slow flowing.

The River Mourne forms the middle section of the main spine of the Foyle Catchment and has a catchment area of 1860km^2. The Mourne is formed at the confluence of the River Strule and River Derg near Ardstraw. The river flows north to Strabane, where it merges with the River Finn to form the River Foyle. The route runs parallel with the western bank of the Mourne. The Mourne is a transitional river with numerous riffle and pool sequences, which flow in a relatively unconfined valley within a large floodplain. The river channel is on average 60m wide and has been heavily modified at Sion Mills, where historically a large weir has been constructed. As the Mourne passes through Strabane the river channel has been modified by various flood defences.

The River Derg rises in the Killeter Uplands to the west of the route and flows eastwards to its confluence with the Strule River near Ardstraw. The route crosses the lower reaches of the Derg close to the confluence. The upper reaches of the catchment, which is approximately 440km^2, are characterised by peatlands, while the lower reaches flow predominantly through farmland. The main stream length of the River Derg is 53km. Within the vicinity of the Proposed Scheme the River Derg is a transitional (piedmont) river characterised by a well-developed valley, reasonably large floodplain and variable substrate with riffle and pool sequences.

The River Strule forms the upper section of the main spine of the Foyle Catchment, and has a catchment area of 1340km^2. The Strule is formed by the confluence of the Camowen and Drumragh rivers in the centre of Omagh. The Strule then flows northwards for approximately 21km before merging with the River Derg to form the Mourne. The entire length of the Strule runs parallel to the route. The Strule has two major tributaries, the Owenkillew which joins the Strule from the east at Newtownstewart and the Fairy Water which joins to the north of Omagh. As the proposed route passes to the west of Newtownstewart the Owenkillew is unlikely to be affected by the proposed road scheme. The route does cross numerous small stream tributaries on the western slopes of the Strule valley. The Strule is a transitional river with variable bed materials, riffle and pool

sequences, an unconfined valley and floodplain. The catchment is predominantly agricultural, although peat bog is present in the upper reaches of the large tributaries and sand and gravel quarrying is present in the Strule valley, particularly north of Newtownstewart.

The Fairy Water rises on the slopes of Bolaght Mountain in west Tyrone and flows eastwards to its confluence with the River Strule to the north of Omagh. It has a catchment area of 180km^2 and a main stream length of 30km. The catchment is predominantly agricultural grassland; however there are significant areas of peat throughout the catchment, particularly in the valley floor. The Proposed Scheme crosses the Fairy Water approximately 500m upstream of its confluence with the Strule. In this area the river is approximately 16m wide and has typical transitional characteristics with a meandering channel pattern and riffle and pool sequences.

The Drumragh River lies in the upper reaches of the Foyle Catchment and is formed to the south of Omagh by the confluence of the Ballynahatty Water and Quiggery Water. It has a catchment area of 321km^2. The Drumragh flows generally north through the centre of Omagh before merging with the Camowen to become the River Strule. The route crosses the Drumragh approximately 2.5km downstream of the Ballynahatty-Quiggery confluence. At this point the river is approximately 10-15m wide and has typical transitional characteristics with variable bed material, riffle and pool sequences and an unconfined valley and floodplain. Due to the nature of the topography in the Drumragh catchment there is an intricate dendritic drainage network, with a large number of tributary streams. The route skirts around the eastern extent of the upper Drumragh catchment, crossing a number of small streams / large field drains within the Routing Burn and Eskragh Water sub-catchments. Many of the streams have been straightened or otherwise modified, with the exception of the Routing Burn main stream length, which is largely unmodified.

The Camowen River rises in the hills to the west of Pomeroy and flows westwards to Omagh, where it joins with the Drumragh to form the River Strule. It has a catchment area of 276km^2. The Proposed Scheme passes through the western extent of the Camowen watershed, crossing the headwaters of a minor tributary to the Camowen River, namely the Ranelly Drain. These headwaters generally rise in the low lying peatlands which have formed between the drumlins that characterise the area. The reaches that the route pass over range from small semi-natural streams a few metres wide with good flow to very narrow ditches with limited flow.

The River Blackwater rises to the west of Fivemiletown and flows eastwards to Aughnacloy then north-east to Lough Neagh. It has a catchment area of 1493km^2. The Proposed Scheme crosses the eastern part of the Upper Blackwater catchment, passing through the major tributary sub-catchments of the Roughan Burn and Ballygawley River, before terminating on the northern bank of the River Blackwater immediately south of Aughnacloy.

The Roughan Burn rises on the southern slopes of Slievemore and flows south through Ballymackilroy before joining the River Blackwater downstream of Augher. It has a

catchment of 27.02km^2. Where the Proposed Route is crossed by the Roughan Burn it is a small, shallow stream with gravel and cobble bed. Although this reach is generally unmodified the lower reaches have been extensively straightened.

The Ballygawley Water rises on the slopes of Eshmore Hill approximately 12.5km northeast of Ballygawley. It has a catchment of 53.25km^2. The river flows through the town before joining the river Blackwater at Lismore Bridge, approximately 6km downstream. The Proposed Scheme crosses the Ballygawley Water approximately 2km downstream of the town. At this point the river is approximately 10m wide with a shallow cobble and gravel bed.

2.3. Environmental obligations of the project during construction phase

2.3.1. The surface water management plan and pollution prevention measures installed as part of the A5WTC will be constructed using best practice and in conformance with the requirements of NIEA and other relevant governing bodies. The key legislation and guidance which will be adhered to are as follows:

- Water Framework Directive (Directive 2000/60/EC)
- Water (Northern Ireland) Order 1999
- Water abstraction and impoundment regulations (licensing) Northern Ireland 2006
- Groundwater regulations (Northern Ireland) 2009 (as amended)
- Control of pollution (oil storage) regulations (Northern Ireland) 2010
- Drainage (Northern Ireland) Order 1973 (as amended)
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009
- Pollution Prevention Guidance Notes (PPGs):
    - PPG01 General guide to the prevention of water pollution
    - PPG02 Above ground oil storage tanks
    - PPG05 Works in near or liable to affect watercourses
    - PPG06 Working at construction and demolition sites

  - PPG07 Refuelling Facilities
  - PPG11 Preventing pollution at industrial sites
  - PPG18 Control of spillages and firefighting runoff
  - PPG20 Dewatering underground ducts and chambers
  - PPG21 Pollution Incident Response Planning
  - PPG23 Maintenance of Structures over Water
  - PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers

- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Pollution from Linear Construction Project. Technical Guidance
- CIRIA Handbook C651 Environmental good practice on site checklist
- CIRIA Report C697 - The SUDS Manual
- CIRIA Report C741 Environmental Good Practice on Site Guide (Fourth Edition)

2.4. Silt Management

2.4.1. Contamination by silt from site runoff into adjoining water courses is a key risk for this project if not properly controlled throughout the construction of the Scheme.

2.4.2. Site discharge licences will be required from NIEA prior to works commencing. Any application for such consent must clearly state how site runoff with be managed, treated and returned to the watercourse.

2.4.3. Site runoff is made up of two components and are the direct results of heavy rain.

2.4.4. The first component is runoff from adjoining land that is not affected by the works. Runoff from adjoining land would be intercepted by the early construction of pre-earthwork drained ditches (PED). This will be one of the first earthwork operations. Where the new road is in a cutting then the PED would be located at the top of the cut. Any water entering this ditch would be runoff from adjoining land thus would not need treating.

2.4.5. The second component is runoff across the works once the topsoil strip has been completed, this could be any of the following:

- Runoff across topsoil strip
- Runoff down cutting slopes
- Runoff down embankments being constructed.

2.5. General Construction Policies

2.5.1. The Silt Management Plan has been developed to minimise and mitigate for the effects of pollution to all local watercourses. However, this does not remove environmental responsibilities from the contractor / sub-contractors. All site personnel should be made aware of their environmental responsibilities through the production of this Construction Method Statement and an environmental induction.

2.5.2. In accordance with BS6031: 2009 Code of Practice for Earthworks, land disturbance will be kept to minimum and disturbed areas will be stabilised as soon as possible. Soil handling will be undertaken with reference to best practice guidelines.

2.5.3. In general the following will be adhered to in terms of the general Earthworks:

- All roads will be kept free from dust and mud deposits.
- Areas of extraction and deposition will be carried out according to BS6031:2009 Code of Practice for Earthworks. Risk assessment will be evaluated to ensure all surface water will be appropriately treated prior to entering a discharge point.
- Any clean surface water not directly linked to a watercourse will be dealt with in the

appropriate manner and field drainage introduced to the nearest stream before work begins.

- Retention ponds will be dug out first. These retention ponds will form part of the permanent SUDS and will be used during the construction period to deal with any surface water and act as sedimentation control.
- Trapezoidal-ditches will be dug out where required to channel any surface water from haul roads into these retention ponds. These will be to minimal gradient and if required straw bales or clean stone will be installed to act as weirs.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works; surface water runoff may also be diverted around the excavations using heavy timbers or similar laid on the surface of the ground.

2.6. Installation Programme

2.6.1. At all times silt management features should be constructed prior to, or at the same time as the construction of the works. Before runoff is allowed to flow through the ditches, or across embankments scrutiny must be given by the contractor that the ditches, ponds slopes and embankments are fully stabilised and will not be affected by erosion. This will prevent the clogging of other parts of the system by the silt that is generated.

2.7. Working in the vicinity of water / Buffer zones

2.7.1. The following recommendations apply to the general construction activities either within the watercourses or in the vicinity of watercourses:

- Where practicable construction near streams should be avoided in wet weather.
- Keep cement and concrete out of watercourses.
- Plan so that roadside drains do not discharge directly into watercourses, but rather through a vegetated buffer area of adequate width.
- Runoff from excavations will NOT be pumped directly to watercourses.
- Should there be any incidents of pollution to the watercourses NIEA will be notified immediately. Immediate steps will be undertaken to resolve the cause of the pollution and where feasible mitigate against the impact of pollution, following the advice set out in PPG21.

2.8. Temporary Haul Roads

2.8.1. It is proposed that as the scheme progresses, the finished permanent roads will act as the temporary haul roads during the construction phase.

- Construction activities will be scheduled to minimise the area and period of time that soil will be exposed, particularly during winter periods.
- Cut-off drains will be installed around the working areas to intercept uncontaminated surface runoff and divert it around and away from the works.

- Stockpiling of materials will be minimized and essential stockpiles will be located as far away as possible from watercourses.
- Drains and culverts will be kept clear of debris and silt traps will be maintained appropriately. Spoil will not be dumped within buffer areas.
- Erosion of embankments will be avoided and, where possible, a vegetation cover will be maintained.
- Roads, drains and silt traps will be inspected for damage after intense storms and also before and after any intensive use.
- Site roads and approaches to river crossings will be regularly brushed or scraped and kept free from dust and mud deposits. Stone hardstandings will be introduced prior to road crossings.

2.9. Settlement Ponds

2.9.1. Where possible, permanent SUDS pond locations will be used during the temporary construction phase to collect silt. At completion of the construction phase the settlement ponds will be fully reinstated to final design requirements.

2.9.2. Site runoff will be intercepted by PED and the ditches will feed into temporary balancing ponds. Straw bales will be placed along the length of the ditch to help early removal of silt.

2.9.3. The ponds will be a minimum of 20m x 10m x 3m deep so that the pond can store approximately 500m^3. The maximum precipitation on a 1 in 75 year rainfall has been used in the storage calculations. An example of the calculations is attached in Appendix C.

2.9.4. The strategy is to collect the silt contaminated runoff at the temporary pond locations, allow the silt to settle and gravity feed the pond water back into the watercourse.

2.9.5. The outlet will be set at a higher level in relation to the inlet so that the pond fills up and allows the silt to settle.

2.9.6. Construction waste materials such as generated silts will be disposed of in such a manner that it does not add risk of additional silt load in the construction runoff.

2.9.7. Settlement ponds will be inspected for damage after intense storms in particular at the entry point and around the forebay area.

2.9.8. In most instances the works will only be affected by normal rain showers and thus operations would stop. Following heavier rainfall events the trace will be allowed to dry before recommencing earthworks operations.

2.10. Exposed Ground and stockpiles

2.10.1. As part of the surface water management plan for the site the following measures have been incorporated for spoil management areas.

- The amount of exposed ground and soil stockpiles will be kept to a minimum.
- Stockpile which will be in place for an extended period of time will be allowed to re-vegetate naturally.
- Short term stock piles will be sealed.
- Cut-off trenches will be installed uphill of spoil management areas to divert flows away from potential sources of silt pollution.
- Silt fences made from a suitable geotextile material will be used alongside all exposed ground where there is a pollution risk. Areas on a steep gradient will be managed to make sure erosion does not take place and small ditches will be considered around the perimeter.

2.11. Excavations

2.11.1. Every effort will be made to prevent water from entering excavations. Cut off ditches will be used to prevent entry of surface water. Clean runoff within the cut off trenches will be discharged back into the natural drainage system.

2.12. Over Pumping

2.12.1. Over pumping will be avoided for construction of culverts within this scheme wherever possible.

2.12.2. Where over pumping is essential, no direct discharge to the existing watercourse will be permitted. Water from the over pumping operation will pass through a stilling pond and a settlement pond before being discharged to the receiving watercourse.

2.12.3. Any over pumping that may be required for other works such as below ground excavations will be strictly controlled by the on-site Environmental Manager using a 'permit to pump' system and regular monitoring of compliance with control measures.

2.12.4. All pumping operations will ensure that the pumps are sited a minimum of 15m away from the water course, drip trays or lined bunds are used to avoid accidental spillage. Spill kits will be located at the pump locations.

2.12.5. All over pumping would be undertaken using the one of the methods outlined below:

- Water pumped into a silt tank will allow any silt to settle before being gravity fed back into the watercourse downstream of the works back into an approved discharge location.
- Water pumped into the PED which incorporate mitigation measures such as check dams and silt traps which would make its way to a settlement lagoon allowing sediment to settle before water is discharged back into an approved discharge location.

2.12.6. If heavy rain was encountered which could result in flood upstream of the works then over pumping and construction operations will be stopped and the works will be allowed to re-fill with water.

2.13. Plant Crossings

2.13.1. In Salmonid catchments, all in stream works will be carried out during the months of May to September inclusive.

2.13.2. In Brook/Sea Lamprey catchments, all in stream works will be carried out during the months of September to March inclusive. It is intended that culverts that are piped in the permanent solution will be piped using the permanent diameter pipe size as a temporary crossing during this 5-7 month timeframe.

2.13.3. Crossing that are required outside of the windows listed above will require a temporary bridge crossing which will span the top bank of the existing watercourse. Precast concrete abutments will be used in order to mitigate the risk of contamination of the watercourse using concrete. The bridge will use steel beams to span the watercourse and precast concrete planks. Details are contained within Appendix D.

2.14. Sampling

2.14.1. A programme of water monitoring will be carried out during the construction phase.

2.14.2. The extent and frequency of the monitoring will be proportionate to the level of activity. Such monitoring will be required in order to:

- Demonstrate that the mitigation measures and surface water management plan is performing as designed;
- Provide reassurance that the in-place mitigation measures are not having a significant impact upon the environment;
- Indicate whether further investigation is required and, where any risks are unacceptable, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

2.14.3. This monitoring will commence prior to the start of work activities to establish the baseline conditions at each work site.

2.14.4. The surface water monitoring programme will be site-specific and tailored to provide a meaningful and pragmatic indication of the state of the water environment. Given the nature of the development, it is considered that the surface water monitoring programme will comprise:

- An initial site walkover to establish base line conditions and identify watercourses which are presently polluted from silt deposition or any other waterborne pollutants.
- Regular visual inspections of surface water management features, such as culverts and receiving watercourses, in order to establish whether there is increased erosion or deposition and sediment.
- Regular visual inspections of watercourses during construction and decommissioning stages, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities.
- Periodic and ad-hoc sampling of surface waters and private water supplies in order to complement the programme of visual inspection.

2.14.5. Additional monitoring required as a condition of discharge consents, abstraction licences or other environmental regulation.

2.14.6. All subsequent monitoring results will be compared with the baseline data-set to identify any impacts of the development on the surface water environment and to identify the requirement for any appropriate remedial measures. The impacts of the development will be deemed acceptable if there is no significant net deviation from the baseline monitoring results.

3. Flood Defences

3.1.1. For works that affect any existing flood defences a secondary defence will be constructed prior to the removal of the existing defence.

3.1.2. No works will be allowed to take place that affects flood defences without prior approval from DfI Rivers and NIEA.

4. Monthly Reporting

4.1.1. NIEA, DfI Rivers and Loughs Agency are all key stakeholders on this project and will be part of the monthly stakeholder meetings. These meetings will review the last months work, discuss the following month's works and discuss lessons learnt. As part of this forum contractors will submit their monthly work schedule, two monthly rolling programme which clearly show the works areas for the following month and their anticipated discharge rates. These will be based on the works area affected and the potential of a 1 in 75 year storm event happening.

Appendices

Appendix A – Scheme Alignment

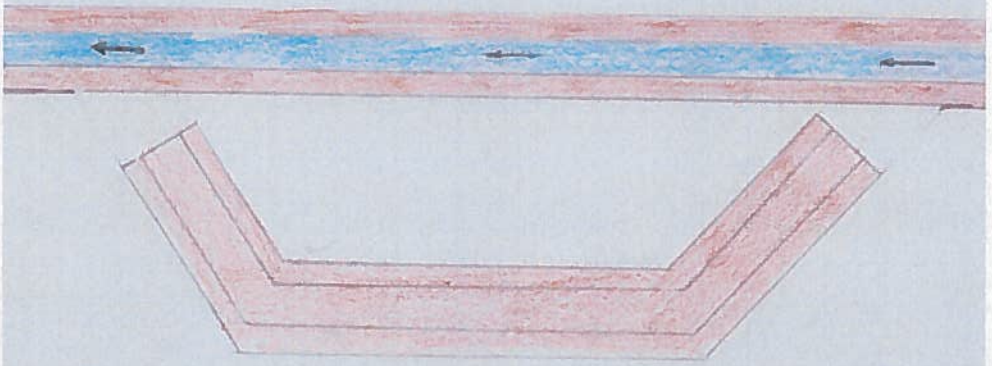
See Main Report Appendix 1 Sheets 1 to 24.

Appendix B – Example Watercourse Crossing Construction Method Statement

1/

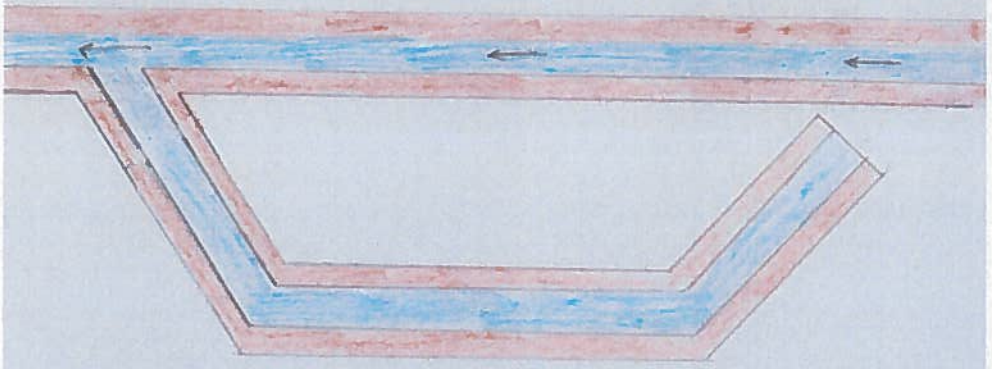
Existing Watercourse

2/



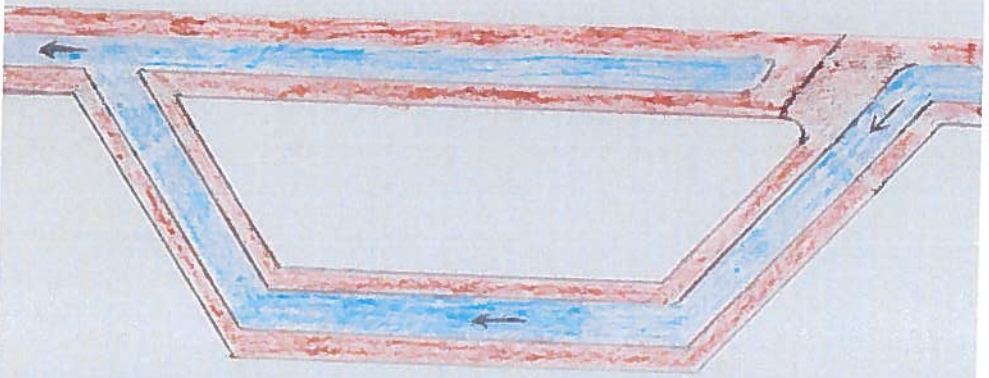
Excavate Watercourse diversion to within 2m of existing watercourse

3/



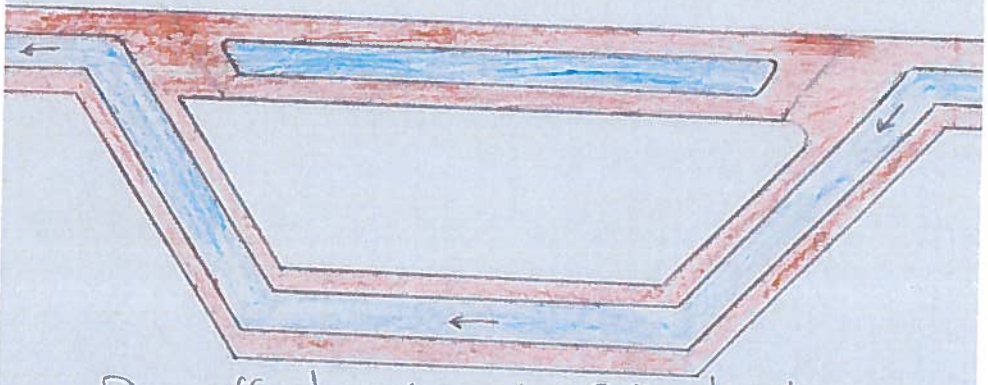
Excavate downstream plug - place silt fence/straw bales downstream to catch any contamination

4/



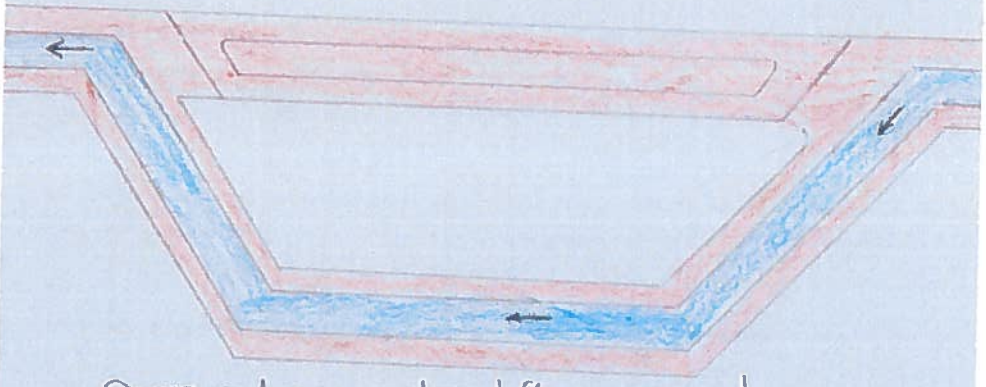
Excavate upstream plug and dam existing watercourse to divert water down new diversion

5/



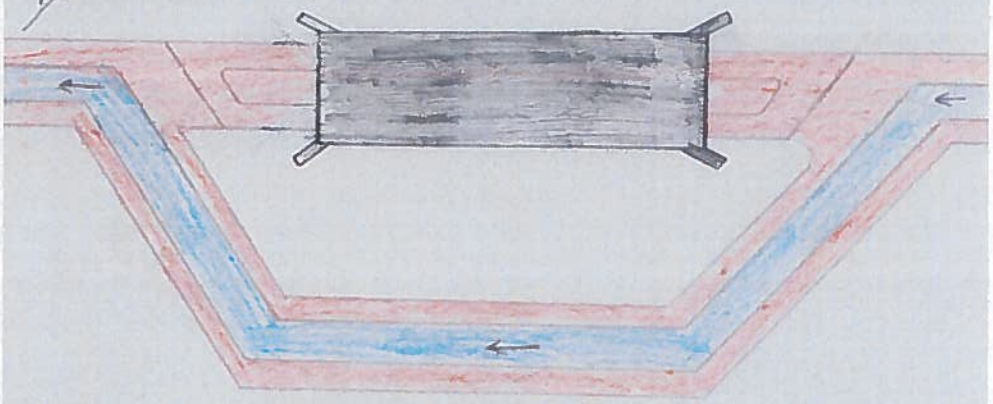
Dam off downstream to fully divert stream
Carry out electrofishing and transfer any fish to new diversion

6/



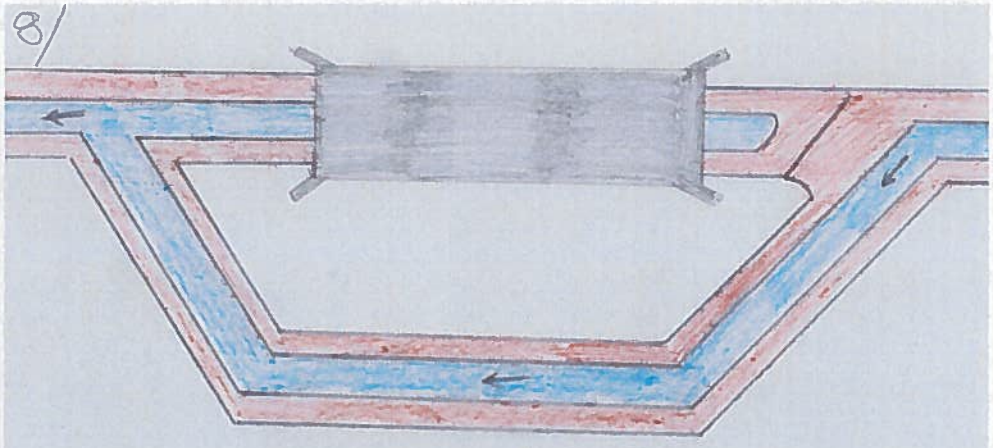
Pump out any water left in original water course

7/



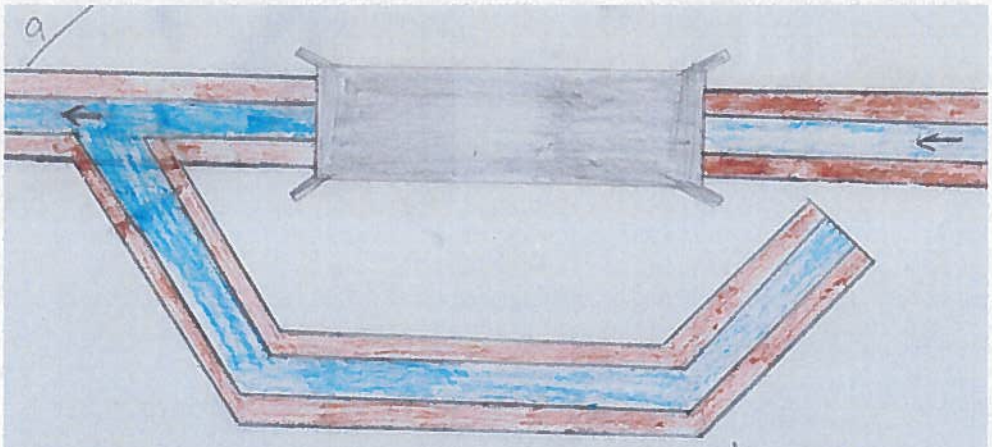
Construct new culvert

8/



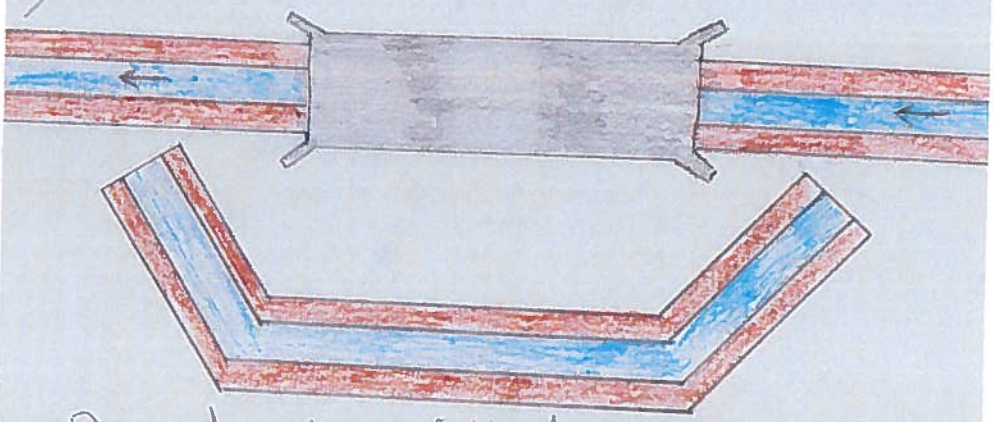
Remove downstream dam from Original water course

9/



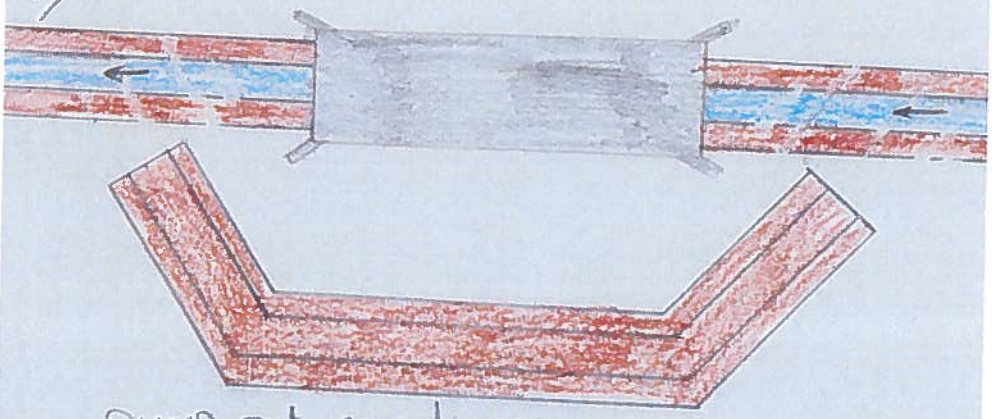
Remove upstream dam from original watercourse and dam upstream of the diversion.

10/



Dam downstream of the diversion
Carry out electrofishing and transfer
any fish to original watercourse

11/



pump out new diversion
and backfill

12/

Completed online culvet

Appendix C – Example Temporary Retention Pond Calculations

A5 WTC
Mainline PED

Schedule of Mainline Ditches

5082906/151/ISH
October 2011
Values Copied for issue in A5WTC_S1_SCH_05_00407
Rev June 2012 - Outfall watercourses identified

Earthworks impermeability = 12.50%
V before lining (m/s) = 1
Depth of ditch = 0.75m
Nominal drainage provision

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area N'bound Side (ha)	Impermeable Contributing Area S'bound side (ha)	Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse Description	Watercourse ID	WFD Waterbody ID
Southbound Side									
1	580-680	-	0.156	34	Pipe to S114 - 225Ø?	34	River Foyle via Mainline drainage		
1	680-900	-	0.369	68	Pipe to S116 - 225Ø?	68	River Foyle via Mainline drainage		
1	900-1240	-	0.58	111	Cross carriageway to separate outfall	111	River Foyle at Ch 1030		
1	1240-1300	-	0.203	33	Direct to watercourse on S'bound side	144	Diversion ID S1-WD-01	UD_0.1 / -	UKGBNI5NW250010
2	1300	-	0.194	32	Land drains direct to watercourse				
2	1300-1500	-	0.506	79	Direct to watercourse on S'bound side				
2	1500-1670	-	0.457	74	Cross carriageway to N'bound earthworks	74	Via N'bound earthworks to R Foyle at S1 OF: 25		
Junction	1670-1875	-	-				No allowance for Junction PED		
3	1875-1960	-	0.322	53	To Mainline or N'bound earthworks	115	Via N'bound earthworks to R Foyle		
3	1960-2120	-	0.418	62	To Mainline or N'bound earthworks				
3	2120-2285	-	0.482	67	To Mainline or N'bound earthworks	96	Via N'bound earthworks to R Foyle		
3	2285-2400	-	0.211	29	To Mainline or N'bound earthworks				
3	2400-2480	-	0.278	41	Direct to watercourse (Gortin Hall Drain) on S'bound side	221	Gortin Hall Drain - Diversion ID S1-WD-16	Gortin Hall Drain / River 2	UKGBNI5NW250010
4	2480	-	0.307	50	Land drains direct to watercourse (Gortin Hall Drain)				
4	2480-2825	-	0.806	130	Direct to watercourse (Gortin Hall Drain) on S'bound side				
4	2825-3045	-	0.92	116	Direct to watercourse on S'bound side	185	Diversion ID S1-WD-02	UD_0.2/ -	UKGBNI5NW250010
4	3045-3225	-	0.511	69	Direct to watercourse on S'bound side				
4+5a	3225-3400	-	0.453	61	Direct to watercourse on S'bound side	120	Blackstone Burn Diversion ID S1-WD-03 Ch 3480-3740 drains through rise in ground	Blackstone Burn / -	UKGBNI5NW250010
5	3400-3480	-	0.098	17	Direct to watercourse on S'bound side				
5	3480-3740	-	0.211	42	Cross carriageway to N'bound earthworks or separate outfall				
5	3740-3860	-	0.101	19	Combines with side road drainage to discharge to diverted watercourse	219	Dunnalong Road. Diversion ID S1-WD-05	UD_0.4/ -	UKGBNI5NW250010
5	3860-3935	-	0.482	49	Conbines with above to discharge to diverted watercourse				
5	3740-3935	-	0	111	Collector ditch includes flow from side road				
5	3935-4290	-	0.142	22	Direct to watercourse on S'bound side				
5	4290-4495	-	0.106	18	Direct to watercourse on S'bound side				
5	4495-4670	-	0.942	118	Cross carriageway to N'bound earthworks				
5	4670-5040	-	0.944	143	Cross carriageway to N'bound earthworks. Includes contribution from side road				
5	5040-5400	-	1.422	208	Cross carriageway to N'bound earthworks				
5	5400-5595	-	0.787	104	Direct to drain on S'bound side. Pipe beneath side road.	173	Unreferenced watercourse at Ch 5595. Opposite Ballybeeny Road	Unreferenced	
5	5595-5750	-	0.445	69	Direct to drain on S'bound side.				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
5	5750-5800	-	0.149	25	Direct to watercourse on S'bound side	637	Diversion ID S1-WD-06. Subject to further detail as ddesign for Bready Cut is developed	UD_05 / River 4	UKGBNI5NW250010
5	5800-6340		0.906	612	Alternative with drainage from 6340-6475. At detail design split between draining to watercourse and side road				
5	5800-6340	-	0.906	158	At detail design split between draining to watercourse and side road drainage				
5	6340-6475	-	0.778	454	Alternative with drainage from 6475-7055 and crosses Victoria Road				
5	6340-6475	-	0.778	137	Crosses Victoria Road to connect to 5800-6340				
5	6475-7055	-	2.76	317	Alternative - connect to drainage in 6340-7055 "Cascade" down slope				
5	6475-7055	-	2.76	317	Connect to Mainline carriageway to ponds to north "Cascade" down slope				
6a	7055-7340	-	0.676	142	Pipe beneath Mainline to discharge to new ditch. (Nom ditch length for grad) "Cascade" down slope	639	To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed.	Bready Village watercourse/culvert	
6a	7340-7835	-	3.51	396	Pipe beneath Mainline to discharge to new ditch.				
6a	7835-8245	-	1.27	151	Direct to watercourse on S'bound side				
6b	8245-8485	-	0.183	28	Direct to watercourse on S'bound side	78	Diversion ID S1-WD-07. Ch7835-8245 split 2:1 to north and south respectively	UD_07 / River 4	UKGBNI5NW250010
6b	8485-8800	-	0.37	61	Connection to Mainline carriageway or N'bound toe of batter - see drg				
6b	8800-9150	-	1.203	133	Culvert beneath Victoria Road to Low Point at Ch9215	342	Burn Dennet S1 OF: 11	Burn Dennet	
6b	8800-9150	-	0	0	Subsidiary ditch between side road and Mainline to drain side road and batter. Culvert under side road.				
7	9150-9500	-	0.306	38					
7	9215	-	0	171	Pipe from Low Point at Ch9215 to				
	9500-9600	-	0.118	18	Drains to 9600-9770				
7	9600-9770	-	0.276	62	Includes flow from 9500-9600				
7	9770-10015	-	0.315	279	Includes flow from 9600-9770, and Low Point at Ch9215				
7	10015-10190	-	0.13	19					
7	10015	-	0	298	Pipe from Low Point at CH10015 to watercourse. Includes flows from Ch9770-10015 and Ch 10015-10190. Could be twin 525Ø or triple 450Ø				
7	10190-10500	-	0	0	Land falls away from road to watercourse. Nom. earthworks drain				
8	10500-10750	-	0.218	44	Ditch direct to watercourse				
8	10750-11000	-	0.074	11	Ditch direct to watercourse	27	Diversion ID S1-WD-08.	Ballydonaghy Drain / -	UKGBNI1NW010101070
8	11000-11220	-	0.08	16	Ditch direct to culvert				
8/9	11220-11880	-	0	0	Upslope intercepted by Victoria Road. Nom. earthworks drain				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
10	11880-12225	-	0.563	90	Culvert beneath Mainline to watercourse on N'bound side	90	Unreferenced watercourse on N'bound side at Ch12047	Unreferenced	

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
10	12225-12370	-	0.412	62	Ditch direct to watercourse	62	Unreferenced watercourse ay Ch12370	Unreferenced	
10	12370-12585	-	1.081	140	Ditch direct to watercourse	140	To upstream end of Culvert S1-PC-10.		
10	12585-12740	-	0.464	73	Ditch direct to watercourse	103	Glenmornan River	Glenmornan River	
10/11	12740-13010	-	0.194	30	Ditch direct to watercourse				
11	13010-13290	-	0.402	57	Ditch direct to watercourse	57	To upstream end of culvert adjacent to S1 OFS: Greenlaw Road 1		
11	13290-13500	-	0.199	33	Ditch direct to watercourse	33	To watercourse adjacent to Park Road		

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
	13500-18000	-	0	0	Land generally flat with ex watercourses, falls from Mainline or intercepted by ex road. Nom earthworks drain		This PED is beyond Junction 3. Outfall information not yet completed.		
17	18000-18180	-	0.15	24	Ditch direct to watercourse				
17	18180-18370	-	0.232	31	Ditch to connectivity culvert then pipe to watercourse				
17	18370-18680	-	0.507	59	Ditch to connectivity culvert then pipe to watercourse				
17	18370	-	0	90	Pipe from ditches to watercourse				
18	18680-19085	-	0.111	12	Ditch direct to watercourse				
	19085-19235	-	0	0	Houses back onto Mainline. Nom. earthworks drain				
19	19235-19575	-	0.106	15	Ditch direct to watercourse				
	19575-19670	-	0	0	Picked up by side road drainage				
	19670-20360	-	0	0	Land falls away from Mainline in cutting				
21	20360-20425	-	0.038	9	Trapped at crest of cutting - connect to Mainline				
	20425-20890	-	0	0	Land falls away from Mainline. Check reinstatement levels for ex pond/quarry. Nom. drainage provision				
21	20890-21190	-	0	51	Land falls away from Mainline. Ditch required to convey flows from higher catchments to watercourse				
21	21190-21260	-	0.029	51	Also conveys flows from higher catchments				
21	21260-21380	-	0.031	45	Also conveys flows from higher catchment. Culvert beneath side road may not be required if side road is stopped up				
21	21380-21620	-	0.282	38	Head of run flowing N'bound. Culvert beneath side road				
22	21620-22000	-	0.562	73	Ditch to diverted watercourse				
22	22000-22290	-	0.316	82	Ditch to diverted watercourse. Also conveys flows from higher catchment				
22	22290-22480	-	0.126	22	Head of run flowing N'bound. Culvert beneath side road				
22	22480-22799	-	0.363	51	Connects to Section 2 PED , or separate outfall to watercourse (not included)				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
Northbound Side									
	500-3400	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	3400-3860	0	-	0	Land falls away from Mainline in cutting				
	3860-4050	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	4050-4940	0	-	0	Land falls away from Mainline in cutting				
	4940-6590	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	6590-6700	0	-	0	Land falls away from Mainline in cutting				
	6700-7200	0	-	0	Land falls away from Mainline. Nom. toe of bund drain				
	7200-7300	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
6a	7300-7825	0.412	-	43	Land direct to new ditch at toe of batter	271	To Bready Village watercourse/culvert S1 OFS: Donagheady Road 3 / Bready Cut Accommodation. Ch7835-8245 split 2:1 to north and south respectively. Subject to further detail as design for Bready Cut is developed.	Bready Village watercourse/culvert	
6a	7825-8145	0.502	-	93	Via ditch to new ditch at toe of batter				
6a	7300-8145	0	-	135	New toe of batter ditch - NB cuts through hill. Excavation through hill required.				
	8145-8230	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	8230-8430	0	-	0	Land falls away from Mainline in cutting				
	8430-8860	0	-	0	Land falls away from Mainline. Nom. toe of bund drain				
	8860-9970	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
7a	9970-10035	0.02	-	6	Trapped against Mainline. Effect of wc div culvert?	65	Burn Dennet S1 OF: 12 or further downstream - subject to further detail	Burn Dennet	
7a	10035-10260	0.45	-	59	Ditch with pipe to watercourse				
	10260-10710	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	10710-10790	0	-	0	Land falls away from Mainline in cutting				
8a	10790-10985	0.043	-	11	Ditch direct to watercourse	11	Diversion ID S1-WD-08.	Ballydonaghy Drain / -	UKGBNI1NW010101070
	10985-11355	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	11355-12300	0	-	0	Land falls away from Mainline in cutting				
	12300-14160	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	14160-14340	0	-	0	Land falls away from Mainline in cutting				
	14340-14400	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
	14400-14800	0	-	0	Land falls away from Mainline in cutting				

Schedule of Mainline Ditches

Mainline Catchment Ref	Chainage (m)	Impermeable Contributing Area		Design Flow (l/s) 1 in 75yrp	Notes	Cum. Design Flow (l/s) 1 in 75yrp	Outfall Watercourse		
		N'bound Side (ha)	S'bound side (ha)				Description	Watercourse ID	WFD Waterbody ID
	14800-19554	0	-	0	Land falls away from Mainline. Nom. toe of batter drain		This PED is beyond Junction 3. Outfall information not yet completed.		
20	19554-19770	0	-	239	Ditch to convey flow from higher catchment. Then picks up side road and junction drainage				
20	19770-20095	0.444	-	239	Conveys flow from higher catchment. Ditch cuts through ridge. Additional excavation required				
20	20095-20250	0.474	-	168	Conveys flow from higher catchment. At downstream end the ditch begins to run against gradient. Additional excavation required.				
20	20250-203900	0.332	-	92	Conveys flow from higher catchment				
21	20390-20500	0.182	-	32	Ditch from high point. Pipe beneath side road				
21	20500-20580	0	-	0	Land falls away from Mainline in cutting				
21	20580-20890	0.054	-	10	Ditch to watercourse by pond				
21	20890-21235	0	-	278	Ditch to convey flow from higher catchment and side road. Land is flat so ditch may also drain some of this area.				
21	21235-21435	2.168	-	278	Contributing area is conservative.				
	21435-21925	0	-	0	Land falls away from Mainline in cutting				
	21925-22000	0	-	0	Land falls away from Mainline. Nom. toe of batter drain				
22	22000-22350	0.202	-	32	Ditch runs through junction				
	22350-22799	0	-	0	Land falls away from Mainline in cutting				

Appendix D – Watercourse Haul Road Crossing Details

DO NOT SCALE

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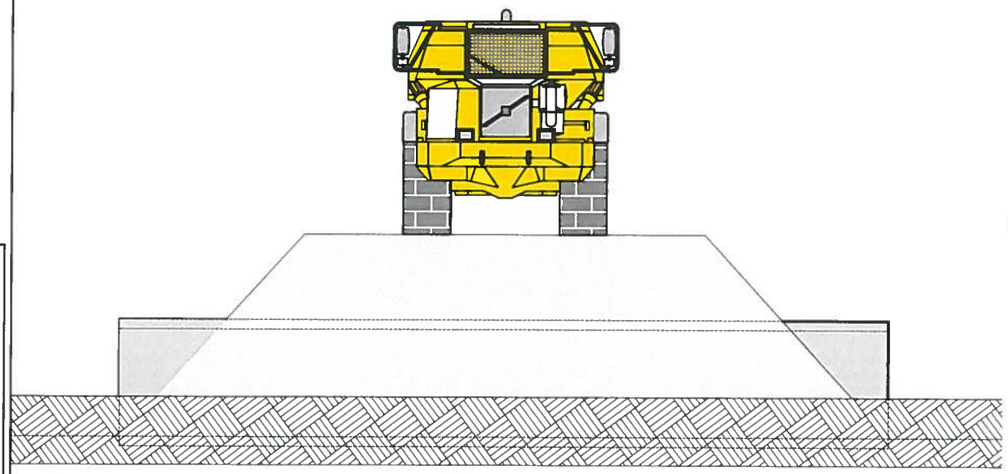
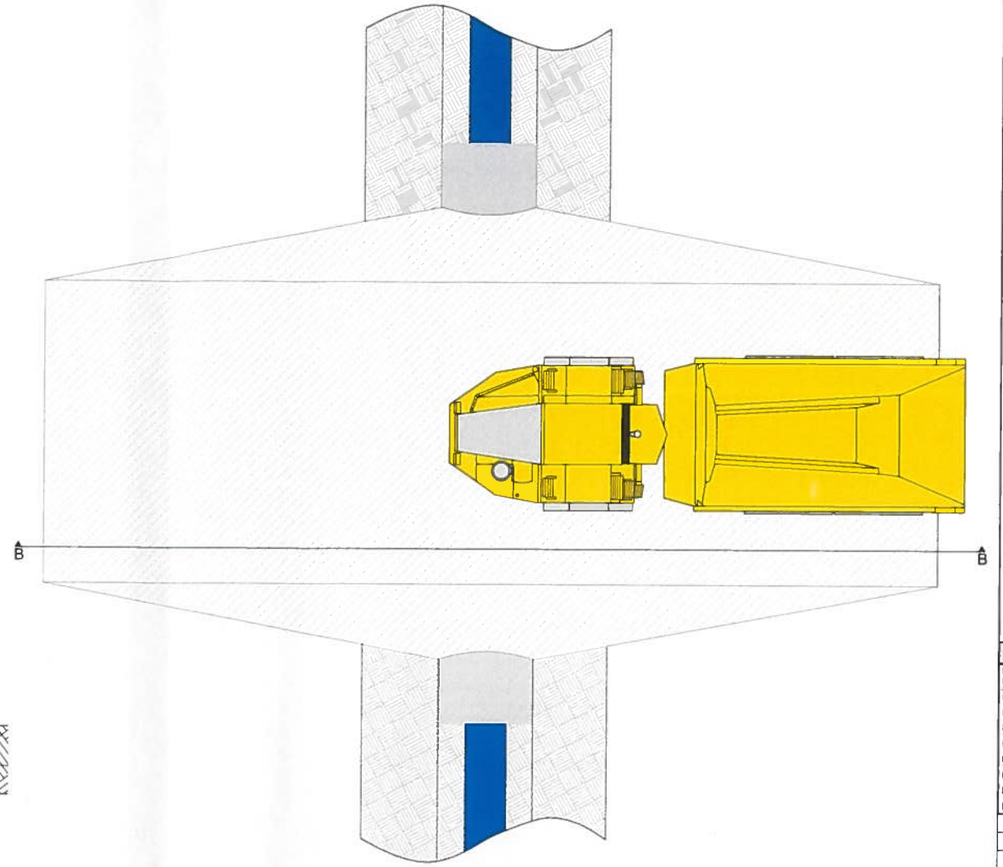
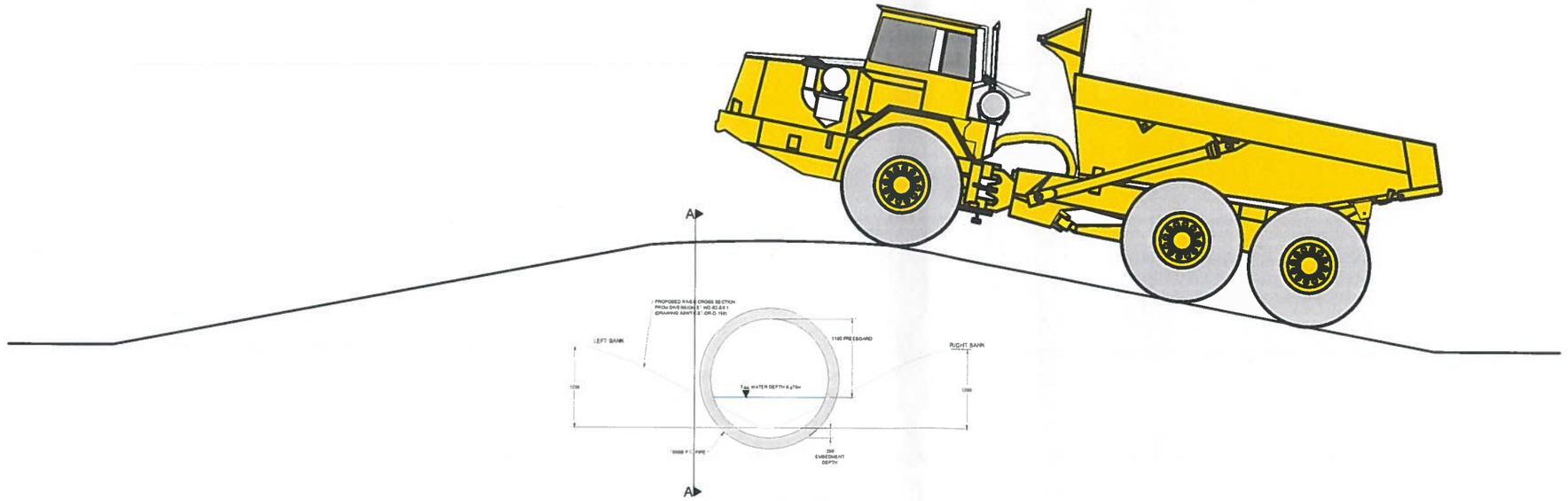


SECTION A-A



PLAN



SECTION B-B

Scale 1:20

CONSTRUCTION NOTES

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
(ENTER 'NONE' IF APPLICABLE)

MAINTENANCE/CLEANING
(ENTER 'NONE' IF APPLICABLE)

USE
(ENTER 'NONE' IF APPLICABLE)

DECOMMISSIONING/DEMOLITION
(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	18/04/13 PMG	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5 WTC Western Transport Corridor

Designer: Arup Atkins

Contractor: BbM

Title: WATERCOURSE PIPE CROSSING GENERAL ARRANGEMENT

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	NTS	PMG Date: 18/04/13	Date:	Date:

Status	Drawing Number	Rev
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DO NOT SCALE

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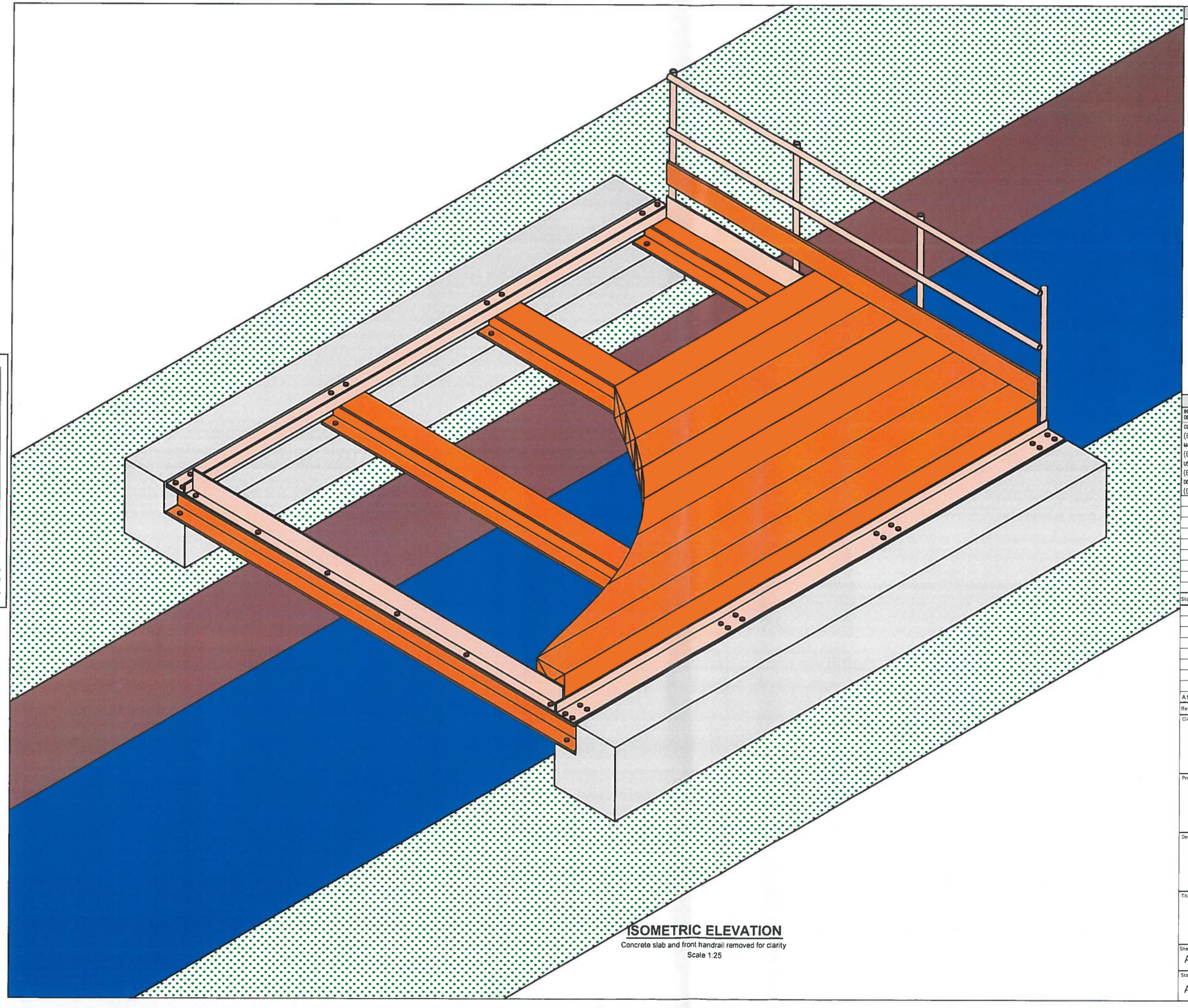

ISOMETRIC ELEVATION

Concrete slab and front handrail removed for clarity

Scale 1:25

CONSTRUCTION NOTES

1. Concrete has been designed to BS8110
2. Steel has been designed to BS5950-1-2011
3. The bridge has been designed for a CAT D740 dumptruck +10% overload
4. Dimensions are in millimeters

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION

(ENTER 'NONE' IF APPLICABLE)

MAINTENANCE/CLEANING

(ENTER 'NONE' IF APPLICABLE)

USE

(ENTER 'NONE' IF APPLICABLE)

DECOMMISSIONING/DEMOLITION

(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	PMG 16/04/13	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5WTC Western Transport Corridor

Designer: Arup Atkins

Contractor: BbM

Title: A5WTC-Section 1-Temporary works watercourse bridge

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:20	PMG Date: 16/04/13	Date:	Date:

Status	Drawing Number	Rev
A1	A5WTC-S1-DRG-16042013	A1

DO NOT SCALE

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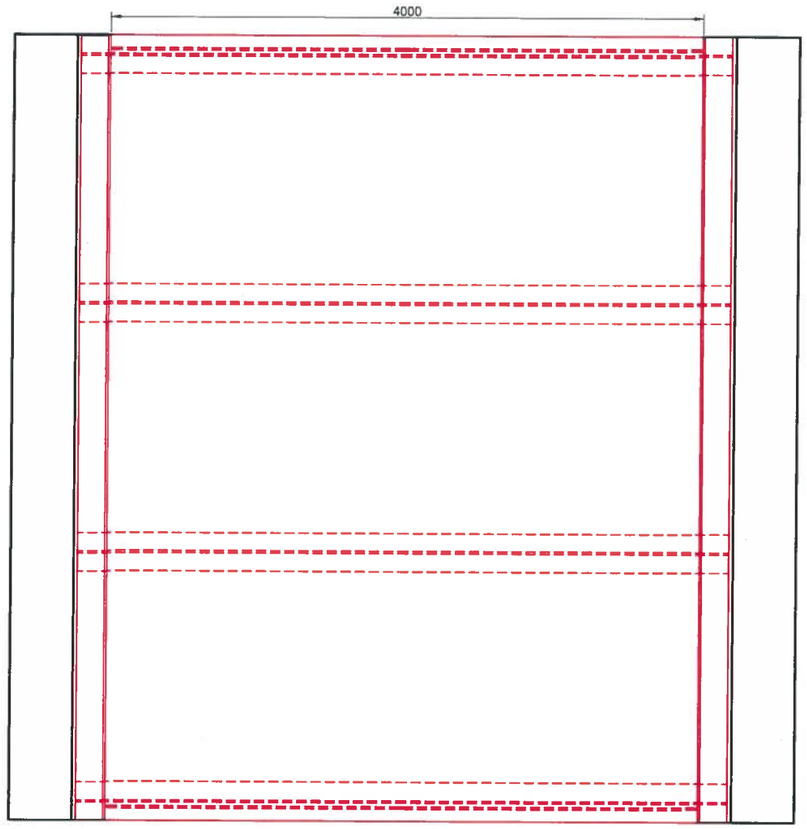
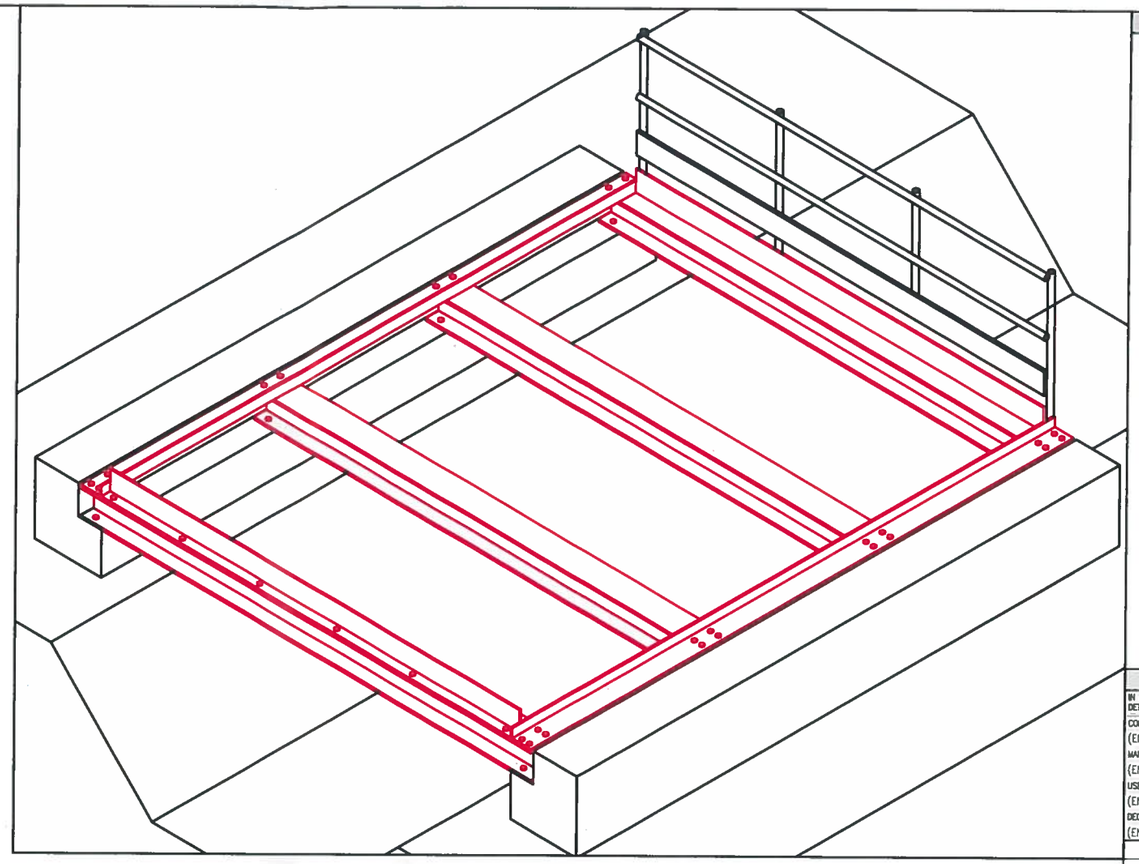
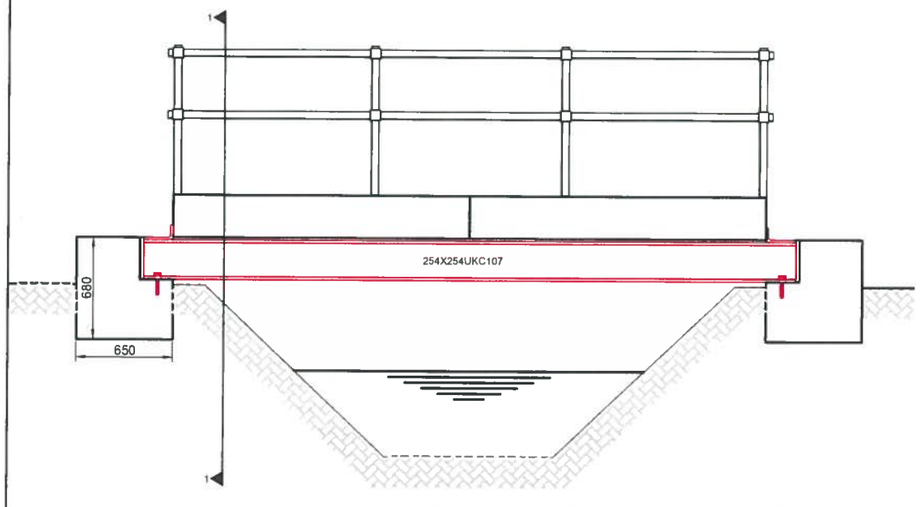


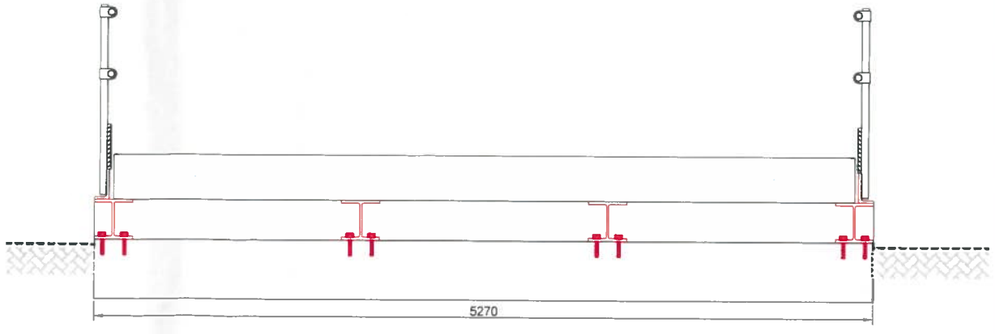
PLAN
Scale 1:20



ISOMETRIC ELEVATION
Concrete slab and front handrail removed for clarity
Scale 1:25



ELEVATION
Scale 1:20



SECTION 1-1
Scale 1:20

CONSTRUCTION NOTES

1. Concrete has been designed to BS8110
2. Steel has been designed to BS5950-1-2011
3. The bridge has been designed for a CAT D740 dumptruck +10% overload.
4. Dimensions are in millimeters

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION
(ENTER 'NONE' IF APPLICABLE)
MAINTENANCE/CLEANING
(ENTER 'NONE' IF APPLICABLE)
USE
(ENTER 'NONE' IF APPLICABLE)
DECOMMISSIONING/DEMOLITION
(ENTER 'NONE' IF APPLICABLE)

Stat	Purpose of Issue	Date	Auth
A1	FOR APPROVAL	PMG 16/04/13	

Rev	Description	By	Date	Chk'd	Auth

Client: ROADS Service

Project: A5 WTC

Designer: Arup Atkins

Contractor: BbM

Title: A5WTC-Section 1-Temporary works watercourse bridge

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:20	PMG Date: 16/04/13	Date:	Date:

Status	Drawing Number	Rev
A1	A5WTC-S1-DRG-16042013	A1

Appendix 7: Natura 2000 Data Forms

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Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 02 February 1999 / updated 12 May 2005

3. Country:

UK (Northern Ireland)

4. Name of the Ramsar site:

Lough Foyle

5. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps.

a) hard copy (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □

b) digital (electronic) format (optional): Yes

6. Geographical coordinates (latitude/longitude)**:**

55 05 24 N 07 01 37 W

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Londonderry

Lough Foyle is situated on the north coast of Northern Ireland immediately downstream and extending to the north-east of the city of Londonderry.

Administrative region: Derry; Derry City; Limavady

8. Elevation (average and/or max. & min.) (metres)**:**

Min. 0
Max. 10
Mean 0

9. Area (hectares)**:** 2204.36

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The site is comprised of a large shallow sea lough which includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal areas of mudflats and sandflats, saltmarsh and associated brackish ditches.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3, 5, 6

Secretariat comment: The RIS provides information requiring the application of Criterion 4. This needs to be included in the next update.

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

This is a particularly good representative example of a wetland complex including intertidal sand and mudflats with extensive seagrass beds, saltmarsh, estuaries and associated brackish ditches.

This is a particularly good representative example of a wetland, which plays a substantial hydrological, biological and ecological system role in the natural functioning of a major river basin which is located in a trans-border position.

Ramsar criterion 2

The site supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant and animal. A range of notable fish species have been recorded for the Lough Foyle estuary and the lower reaches of some of its tributary rivers. These include allis shad *Alosa alosa*, twaite shad *A. fallax fallax*, smelt *Osmerus eperlanus* and sea lamprey *Petromyzon marinus*, all of which are Irish Red Data Book species. In addition, important populations of Atlantic salmon *Salmo salar* migrate through the system to and from their spawning grounds.

Ramsar criterion 3

The site supports a diverse assemblage of wintering waterfowl which are indicative of wetland values, productivity and diversity. These include internationally important populations of Whooper Swan *Cygnus cygnus*, Light-bellied Brent Goose *Branta bernicla hrota* and Bar-tailed Godwit *Limosa lapponica*. Additional wildfowl species which are nationally important in an all-Ireland context are Red-throated Diver *Gavia stellata*, Great crested Grebe *Podiceps cristatus*, mute swan *Cygnus olor*, Bewick's Swan *C. columbianus*, Greylag Geese *Anser anser*, Shelduck *Tadorna tadorna*, Teal *Anas crecca*, Mallard *Anas platyrhynchos*, Wigeon *A. penelope*, Eider *Somateria mollissima*, and Red-breasted Merganser *Mergus serrator*. Nationally important wader species are Oystercatcher *Haematopus ostralegus*. Golden Plover *Pluvialis apricaria*, Grey Plover *Pluvialis squatarola*, Lapwing *Vanellus vanellus*, Knot *Calidris canutus*, Dunlin *C. aplina*, Curlew *Numenius arquata*, Redshank *Tringa tetanus* and Greenshank *T. nebilaria*.

Ramsar criterion 5

The site supports about 29000 migrating birds.
Species and numbers are listed in section 20

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Whooper swan , *Cygnus cygnus*, Iceland/UK/Ireland	882 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/9-2002/3)
Light-bellied brent goose, *Branta bernicla hrota*, East Canada/Ireland	2270 individuals, representing an average of 11.3% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Bar-tailed godwit , *Limosa lapponica lapponica*, W Palearctic	2028 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
See Sections 19/20 for details of noteworthy species
Details of bird species occuring at levels of National importance are given in Section 20

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13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation)**:**

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

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14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	sand, mud
Geomorphology and landscape	intertidal sediments (including sandflat/mudflat), estuary, lagoon
Nutrient status	no information
pH	no information
Salinity	brackish / mixosaline, saline / euhaline
Soil	no information
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Carmoney, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/carmoney.html) Max. daily temperature: 12.1° C Min. daily temperature: 5.9° C Days of air frost: 27.6 Rainfall: 993.0 mm Hrs. of sunshine: 1179.0

General description of the Physical Features:

Lough Foyle comprises a large, shallow sea lough that includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal mudflats and sandflats (with mussel *Mytilus edulis* beds), saltmarsh and associated brackish ditches.

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15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Lough Foyle comprises a large, shallow sea lough that includes the estuaries of the rivers Foyle, Faughan and Roe. The site contains extensive intertidal mudflats and sandflats (with mussel *Mytilus edulis* beds), saltmarsh and associated brackish ditches.

The Foyle Basin comprises eastern Co. Donegal from Inishowen Head to Lough Derg, western Co. Derry from Binevenagh through to Fintona in West Co. Tyrone.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

No special values known

17. Wetland types

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	94.4
H	Salt marshes	3.6
J	Coastal brackish / saline lagoons	2

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The littoral communities found in Lough Foyle reflect the dominance of intertidal sands and muds. While rocky substrate is very limited, the extensive beds of common mussel *Mytilus edulis* provide a stable surface for acorn barnacle *Semibalanus balanoides* and edible periwinkle *Littorina littorea*. The polychaete green leaf worm *Eulalia viridis* is a common associate. The soft shores hold a range of invertebrates typical of mud and sand shores, with a number of species, such as the polychaete worm *Hediste diversicolor*, indicative of reduced salinity conditions. Balls Point has the highest diversity of sediment and community types in Lough Foyle and holds large populations of the bivalves sand gaper *Mya arenaria* and peppery furrow shell *Scrobicularia plana*.

The intertidal area consists of extensive mudflats, which support large beds of both common mussel *Mytilus edulis* and eelgrass *Zostera* spp. The latter are amongst the largest colonies of this vegetation type in Northern Ireland and includes two species, narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei*. Large stands of saltmarsh vegetation occur along the foreshore, displaying a transitional sequence of community types. The lower colonising saltmarsh consists of a community dominated by common saltmarsh-grass *Puccinellia maritima*. As tidal influence declines up the shore, this is replaced by a 'middle-marsh' community, characterised by red fescue *Festuca rubra* and mud rush *Juncus gerardii*. Localised stands of sea club-rush *Bolboschoenus maritimus* and common reed *Phragmites australis* also occur. The uppermost saltmarsh features a community dominated by common couch *Elytrigia repens*. Just west of the Ballykelly Bank, on the large intertidal mudflats which form part of a larger creek network, the lower saltmarsh communities are replaced by extensive stands of common cord-grass *Spartina anglica*. Brackish dykes behind the shore support a maritime aquatic and swamp vegetation, including the rare reflexed saltmarsh-grass *Puccinellia distans* and spiral tasselweed *Ruppia cirrhosa*.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

None reported

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species with peak counts in spring/autumn:

Great crested grebe , *Podiceps cristatus cristatus*, NW Europe	179 individuals, representing an average of 5.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	102 individuals, representing an average of 2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , *Anas penelope*, NW Europe	7259 individuals, representing an average of 5.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	1232 individuals, representing an average of 1.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Mallard , *Anas platyrhynchos platyrhynchos*, NW Europe	1214 individuals, representing an average of 2.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common eider , *Somateria mollissima mollissima*, NW Europe	231 individuals, representing an average of 11.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	199 individuals, representing an average of 1.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3 - spring peak)
Ruff , *Philomachus pugnax*, Europe/W Africa	5 individuals, representing an average of 25% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	6 individuals, representing an average of 40% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	44 individuals, representing an average of 4.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Mew gull , *Larus canus canus*, Europe to N Africa	3760 individuals, representing an average of 5.5% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Red-throated diver , *Gavia stellata*, NW Europe	14 individuals, representing an average of 1.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Slavonian grebe , *Podiceps auritus*, Northwest Europe	6 individuals, representing an average of 20% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Greylag goose , *Anser anser anser*, Iceland/UK, Ireland	67 individuals, representing an average of 1.7% of the all-Ireland population (5 year peak mean 1991/92-1995/96)
Common shelduck , *Tadorna tadorna*, NW Europe	382 individuals, representing an average of 5.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Red-breasted merganser , *Mergus serrator*, NW & C Europe	36 individuals, representing an average of 1.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	2809 individuals, representing an average of 5.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	3430 individuals, representing an average of 1.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	4595 individuals, representing an average of 3.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	2162 individuals, representing an average of 2.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	1286 individuals, representing an average of 5.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Fish.

Alosa alosa, Alosa fallax, Osmerus eperlanus, Petromyzon marinus

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Environmental education/ interpretation
Fisheries production
Livestock grazing
Scientific research
Sport hunting
Tourism

22. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	+
Public/communal	+	

23. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism		+
Recreation	+	
Current scientific research	+	
Gathering of shellfish	+	

Bait collection	+	
Hunting: recreational/sport	+	
Industrial water supply	+	
Sewage treatment/disposal	+	
Harbour/port		+
Flood control	+	
Transport route		+
Urban development		+

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Introduction/invasion of non-native plant species	2		+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Introduction/invasion of non-native plant species - Conservation Objectives for the site have been developed. These highlight the need for addressing the *Spartina* issue. Extent of *Spartina* extent being monitored. Future trials of selective herbicides to be undertaken ASAP.
Site to be assessed to determine effectiveness of *Spartina* spraying. Rotovating techniques may be trialed.

Is the site subject to adverse ecological change? YES

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	

Management agreement	+	
Site management statement/plan implemented	+	
Other		+
Area of Outstanding National Beauty (AONB)	+	
Special Area of Conservation (SAC)	+	

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The site is occassionally used by local academic institutions.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

A small education centre at Magilligan occasionally uses the Lough for study and research.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.
Magilligan Point is a popular recreation venue for bathing.

Facilities provided.
Discussions regarding a passenger ferry from Magilligan Point to Greencastle on the Southern Irish shores of the Lough have been on-going.

Seasonality.
During the summer months

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **13** above), list full reference citation for the scheme.

Site-relevant references

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1997) *Coasts and seas of the United Kingdom. Region 17. Northern Ireland*. Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Buck, AL & Donaghy, A (eds.) (1996) *An inventory of UK estuaries. Volume 7. Northern Ireland*. Joint Nature Conservation Committee, Peterborough

Cooper, EA, Crawford, I, Malloch, AJC & Rodwell, JS (1992) *Coastal vegetation survey of Northern Ireland*. (Contractor: University of Lancaster, Unit of Vegetation Science). Unpublished report to Department of the Environment (Northern Ireland), Belfast

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Crowe, O (2005) *Ireland's wetlands and their waterbirds: status and distribution.* BirdWatch Ireland, Newcastle, Co. Wicklow

Lacambra, C, Cutts, N, Allen, J, Burd, F & Elliott, M (2004) *Spartina anglica*: a review of its status, dynamics and management. *English Nature Research Reports*, No. **527**. www.english-nature.org.uk/pubs/publication/PDF/527.pdf

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content.* Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Way, LS, Grice, P, MacKay, A, Galbraith, CA, Stroud, DA & Pienkowski, MW (1993) *Ireland's Internationally Important Bird Sites: a review of sites for the EC Special Protection Area network.* Joint Nature Conservation Committee, Peterborough, for Department of the Environment (Northern Ireland), Belfast, and Irish Wildlife Service, Dublin

Weighell, AJ, Donnelly, AP & Calder, K (eds.) (2000) *Directory of the Celtic coasts and seas.* Joint Nature Conservation Committee, Peterborough

Wilkinson, M, Fuller, IWA, Telfer, TC, Moore, CG & Kingston, PF (1988) *Northern Ireland Littoral Survey: A conservation-orientated survey of the intertidal seashore of Northern Ireland*. Institute of Offshore Engineering, Heriot-Watt University, Edinburgh

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 05 January 1976 / Updated: May 2005

3. Country:

UK (Northern Ireland)

4. Name of the Ramsar site:

Lough Neagh and Lough Beg

5. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps.

a) hard copy (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ☐

b) digital (electronic) format (optional): Yes

6. Geographical coordinates (latitude/longitude)**:**

54 34 11 N 06 24 34 W

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Belfast

Lough Neagh is situated in the centre of Northern Ireland. It is the largest freshwater lake in the United Kingdom, covering an area of 383 square km, with a longest length of 30.5 km and narrowest width of 12.1 km across the middle.

Administrative region: Antrim; Armagh; Ballymena; Cookstown; Craigavon; Down; Dungannon; Lisburn; Londonderry; Magherafelt; Tyrone

8. Elevation (average and/or max. & min.) (metres)**:**

Min. No information available
Max. No information available
Mean No information available

9. Area (hectares)**:** 50165.84

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Lough Neagh is situated in the centre of Northern Ireland. It is the largest freshwater lake in the United Kingdom covering an area of 383 km2 with a longest length of 30.5 km and narrowest width of 12.1 km across the middle. The lake is very shallow for its size, with a mean depth of 8.9 metres. At its deepest point it extends down to 34 metres. The 125 km shoreline is mostly exposed with wave-beaten rocks and stones but there are also some sheltered, sandy bays with better-developed marginal vegetation including some reedbeds.

This site also contains a smaller lake, Lough Beg (1,125 ha) to the north, as well as a small satellite lake, Portmore Lough (286 ha) which is situated to the east of Lough Neagh. Lough Beg (meaning 'little lough') is essentially a widening of the Lower Bann River just downstream from where it leaves Lough Neagh. Lough Beg is very shallow, with a mean depth of 1-2 metres and a surface area of km2. About 200 hectares of the west shore is unimproved wet grassland that is largely inundated with floodwater each winter.

Rivers flowing into Lough Neagh drain about 43% of Northern Ireland, plus part of County Monaghan in the Republic of Ireland.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3, 4, 5, 6

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

A particularly good representative example of natural or near-natural wetlands, common to more than one biogeographic region. The site is the largest freshwater lake in the United Kingdom. Lough Neagh a relatively shallow body of water supporting beds of submerged aquatic vegetation fringed by associated species-rich damp grassland, reedbeds, islands, fens, marginal swampy woodland and pasture. Other interesting vegetation types include those associated with pockets of cut-over bog, basalt rock outcrops and boulders, and the mobile sandy shore.

Ramsar criterion 2

Supports an appreciable assemblage of rare, vulnerable or endangered species or sub-species of plant or animal or an appreciable number of individuals of any one of these species. The site supports over 40 rare or local vascular plants which have been recorded for the site since 1970; the most notable are eight-stamened waterwort *Elatine hydropiper*, marsh pea *Lathyrus palustris*, Irish lady's tresses *Spiranthes romanzoffiana*, alder buckthorn *Frangula alnus*, narrow small-reed *Calamagrostis stricta* and holy grass *Hierochloe odorata*. The Lough and its margin are also home to a large number of rare or local invertebrates, including two aquatic and two terrestrial molluscs, a freshwater shrimp *Mysis relicta*, eight beetles, five hoverflies, seven moths and two butterflies. Of the rare beetles recorded two, *Stenus palposus* and *Dyschirius obscurus*, have their only known Irish location around the Lough. The Lough also supports twelve species of dragonfly.

Ramsar criterion 3

This site is of special value for maintaining the genetic and ecological diversity of a region becuse of the quality and peculiarities of its flora and fauna. The site regularly supports substantial numbers of individuals from particular groups of waterfowl which are indicative of wetland values, productivity and diversity. In addition, this site is of special value for maintaining the genetic and ecological diversity of Northern Ireland because of the quality and peculiarities of its flora and fauna. A large

number of plants and animal species are confined or almost confined to this area within Northern Ireland.

Ramsar criterion 4

This site is of special value as the habitat of plants or animals at a critical stage of their biological cycles. The site supports an important assemblage of breeding birds including the following species with which occur in nationally important numbers: great crested grebe *Podiceps cristatus*, gadwall *Anas strepera*, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, snipe *Gallinago gallinago* and redshank *Tringa totanus*. Other important breeding wetland species include shelduck *Tadorna tadorna*, teal *Anas crecca*, shoveler *Anas clypeata*, lapwing *Vanellus vanellus* and curlew *Numenius.arquata*.

Ramsar criterion 7

The site supports a population of pollan *Coregonus autumnalis*, one of the few locations in Ireland and one of the two known locations in the UK (the other is Lower Lough Erne). It is one of the most important species in Ireland in terms of faunal biodiversity since it occurs nowhere else in Europe, and the Irish populations are all well outside the typical range – the Arctic Ocean drainages of Siberia, Alaska and north-western Canada, where it is known as the Arctic cisco.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
86639 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Tundra swan , *Cygnus columbianus bewickii*, NW Europe	26 individuals, representing an average of 1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Common goldeneye , *Bucephala clangula clangula*, NW & C Europe	6645 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Common pochard , *Aythya ferina*, NE & NW Europe	20279 individuals, representing an average of 5.7% of the population (5 year peak mean 1998/9-2002/3)
Greater scaup , *Aythya marila marila*, W Europe	3377 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)
Tufted duck , *Aythya fuligula*, NW Europe	17807 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)
Whooper swan , *Cygnus cygnus*, Iceland/UK/Ireland	1523 individuals, representing an average of 7.2% of the population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under

criterion 6.

Species with peak counts in spring/autumn:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	1628 individuals, representing an average of 1.3% of the population (5 year peak mean 1998/9-2002/3)
Mute swan , *Cygnus olor*, Britain	1874 individuals, representing an average of 4.9% of the population (5 year peak mean 1998/9-2002/3)

More contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey Alerts report, which is updated annually. See http://www.bto.org/survey/webs/webs-alerts-index.htm.

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13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation)**:**

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

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14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	sand, clay, peat, basalt
Geomorphology and landscape	lowland, floodplain
Nutrient status	highly eutrophic
pH	no information
Salinity	fresh
Soil	no information
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Aldergrove, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/aldergrove.html) Max. daily temperature: 12.5° C Min. daily temperature: 5.8° C Days of air frost: 39.1 Rainfall: 862.4 mm Hrs. of sunshine: 1313.7

General description of the Physical Features:

No information available

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15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Lough Neagh is situated in the centre of Northern Ireland. It is the largest freshwater lake in the British Isles and is very shallow for its size.

Six major rivers flow into the Lough while the Lower Bann River provides the exit, carrying water from the north end of the Lough at Toome to the sea on the north coast of Northern Ireland.

The rivers flowing into Lough Neagh drain about 43% of Northern Ireland, plus part of County Monaghan in the Republic of Ireland. There is no incursion of seawater into Lough Neagh.

Lough Beg and Portmore Lough are two smaller lakes associated with Lough Neagh. Lough Beg (1,125 ha) lies to the north of Lough Neagh at the start of the Lower Bann River and Portmore Lough (286 ha) flows into the south-east of Lough Neagh.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Flood water storage / desynchronisation of flood peaks

17. Wetland types

Inland wetland

Code	Name	% Area
O	Freshwater lakes: permanent	77.6
U	Peatlands (including peat bogs swamps, fens)	4
W	Shrub-dominated wetlands	2.1
Xp	Forested peatland	0.3
Other	Other	16

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

Most of the shoreline and shallow margin of the Lough is exposed to wave action and has a rocky or sandy character. The submerged and floating aquatic vegetation is confirmed to sheltered bays and inlets and includes very extensive stands of fennel-leaved pondweed *Potamogeton pectinatus* and slender-leaved pondweed *P. filiformis* intermixed with smaller quantities of additional species.

Swamp vegetation generally consists of a mosaic of small stands of common spike-rush *Eleocharis palustris*, reedmace *Typha latifolia*, branched bur-reed *Sparganium erectum*, flowering rush *Butomus umbellatus*, bulrush *Scirpus lacustris* and bottle sedge *Carex rostrata*. Locally, large stands of common reed *Phragmites australis* have developed.

The tall fen occurring along the water's edge mostly consists of a thin, generally species-poor band of reed canary-grass *Phalaris arundinacea*, hemlock water dropwort *Oenanthe crocata*, yellow loosestrife *Lysimachia vulgaris* and purple loosestrife *Lythrum salicaria*, but in places there are a number of more uncommon plant species.

Some of the Lough shore is fringed by a fragmented, swampy woodland of alder *Alnus glutinosa* and willow *Salix* spp. related to successive lowerings of water-levels. This woodland is among the best of its type in Northern Ireland. It is extensive and locally contains a diversity of plants including many notable species.

The remainder of the shore is mostly covered by a variety of grassland types ranging from improved and reseeded grassland to species-rich hay meadows, with the most characteristic type being wet marshy grassland with soft rush *Juncus effusus* and brown sedge *Carex disticha* as the most prominent species.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Elatine hydropiper, Spiranthes romanzoffiana, Calamagrostis stricta, Hierochloe odorata, Mentha pulegium, Lathyrus palustris, Frangula alnus, Carex elongata

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Black-headed gull , *Larus ridibundus*, N & C Europe	3269 apparently occupied nests, representing an average of 6% of the all-Ireland population (Seabird 2000 Census)
Common tern , *Sterna hirundo hirundo*, N & E Europe	93 apparently occupied nests, representing an average of 3% of the all-Ireland population (Seabird 2000 Census)
Lesser black-backed gull , *Larus fuscus graellsii*, W Europe/Mediterranean/W Africa	451 apparently occupied nests, representing an average of 8.6% of the all-Ireland population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Common coot , *Fulica atra atra*, NW Europe	5680 individuals, representing an average of 22.7% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	126 individuals, representing an average of 21% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Great crested grebe , *Podiceps cristatus cristatus*, NW Europe	1227 individuals, representing an average of 35% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Lesser black-backed gull , *Larus fuscus graellsii*,	1174 individuals, representing an average of 1.6% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Mallard , *Anas platyrhynchos platyrhynchos*, NW Europe	5136 individuals, representing an average of 10.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Red-breasted merganser , *Mergus serrator*, NW & C Europe	25 individuals, representing an average of 1.2% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe	138 individuals, representing an average of 1.9% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	1878 individuals, representing an average of 2.8% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , *Anas penelope*, NW Europe	3012 individuals, representing an average of 2.4% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	8249 individuals, representing an average of 4.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	355 individuals, representing an average of 7.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Mew gull , *Larus canus canus*, Europe to N Africa	765 individuals, representing an average of 1.1% of the all-Ireland population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	10968 individuals, representing an average of 4.3% of the all-Ireland population (5 year peak mean 1998/9-2002/3)

Species Information

Assemblage.

During the breeding season the site supports a diverse assemblage of waterfowl, including: *Larus ridibundus, Podiceps cristatus, Anas strepera, Tringa totanus, Gallinago gallinago, Aythya fuligula, Aythya ferina, Anas clypeata, Larus fuscus* and *Larus canus*.

Pollan *Coregonus autumnalis*

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Conservation education
Current scientific research
Fisheries production
Livestock grazing
Non-consumptive recreation
Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

22. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation	+	
Local authority, municipality etc.	+	
Private	+	
Public/communal	+	

23. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	
Recreation	+	
Research	+	
Fishing: commercial	+	
Fishing: recreational/sport	+	
Rough or shifting grazing	+	
Hunting: recreational/sport	+	
Sewage treatment/disposal	+	

Flood control	+	
Mineral exploration	+	
Domestic water supply	+	
Non-urbanised settlements		+

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Eutrophication	2	The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments.	+		+
Pollution - fertilisers	2	The Lough drains some 40% of Northern Ireland and has been subject to severe eutrophication as a result of increased nutrient inputs from agricultural run-off and general domestic sewage from catchment housing and other developments.	+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Eutrophication - Phosphate-stripping at appropriate sewage treatment works had begun to address the issue of eutrophication, but the nutrient problem has now been demonstrated to be predominantly due to non-point, agricultural, sources. Water Catchment Management Plan will be developed in context of the Water Framework Directive.

Pollution - fertilisers - Phosphate-stripping at appropriate sewage treatment works had begun to address the issue of eutrophication, but the nutrient problem has now been demonstrated to be predominantly due to non-point, agricultural, sources. Water Catchment Management Plan will be developed in context of the Water Framework Directive.

Is the site subject to adverse ecological change? YES

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
SSSI / ASSI	+	
NNR	+	
SPA	+	
Land owned by a NGO for nature conservation	+	
Site management statement/plan implemented	+	
SAC	+	

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory birds and wildfowl and waders are monitored annually as part of the national Irish Wetland Birds Survey (I-WEBS) organised by the IWC Birdwatch Ireland, the National Parks and Wildlife Service (Ireland) and the Wildfowl and Wetlands Trust.

Miscellaneous.

The University of Ulster has a freshwater research laboratory on the shores of Lough Neagh.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Lough Neagh Discovery Centre is located on the southern shores of Lough Neagh and is run by Craigavon Borough Council. School groups and other incidental visitors are also catered for at the nearby Environment and Heritage Service Warden's office/information centre.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

There is regular use of parts of the site for informal recreation.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service, Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **13** above), list full reference citation for the scheme.

Site-relevant references

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Smart, M (1989) *Ramsar Advisory Missions: Report No. 10: Lough Neagh / Lough Beg, Northern Ireland, UK (1989).* Ramsar Convention Bureau, Gland. www.ramsar.org/ram_rpt_10e.htm

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content.* Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Way, LS, Grice, P, MacKay, A, Galbraith, CA, Stroud, DA & Pienkowski, MW (1993) *Ireland's Internationally Important Bird Sites: a review of sites for the EC Special Protection Area network*. Joint Nature Conservation Committee, Peterborough, for Department of the Environment (Northern Ireland), Belfast, and Irish Wildlife Service, Dublin

Wolfe-Murphy, SA, Lawrie, EW, Smith, SJ & Gibson, CE (1993) *Northern Ireland Lakes Survey*. Unpublished report to Northern Ireland Department of Environment, Countryside and Wildlife, Belfast

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
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Criteria for the designation of Wetlands of International Importance

Group A of the criteria Sites containing representative, rare or unique wetland types		**Criterion 1:** A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
Group B of the criteria Sites of international importance for conserving biodiversity	Criteria based on species and ecological communities	**Criterion 2:** A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
		Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
		Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
	Specific criteria based on waterbirds	**Criterion 5:** A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
		Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
	Specific criteria based on fish	**Criterion 7:** A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
		Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
	Specific criteria based on other taxa	**Criterion 9:** A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

For further information, please contact:
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Appendix 8: Integrity of Site Checklists

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Table A8. 1 Integrity of Site Checklist for Lough Foyle Ramsar Site

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Table A8.2 Integrity of Site Checklist for Lough Neagh & Lough Beg Ramsar

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No

Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Appendix 9 – Outfall Discharge Velocity Assessment

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Table A9.1 Salmonid Habitats Details Section 1

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Foyle River (Various Chainages)				S1 OF: 01.1	U	0.65 m/s
				S1 OF: 02.1.A	U	0.65 m/s
				S1 OF PED: 05	U	0.65 m/s
				S1 OF: 02.1.B	U	0.65 m/s
				S1 OF PED: 06	U	0.65 m/s
				S1 OF: 25	U	0.65 m/s
				S1 OF PED: 10A	U	0.65 m/s
				S1 OFS : Victoria Road 2A	U	0.65 m/s
				S1 OF PED: 10	U	0.65 m/s
				S1 OF PED: 11	U	0.65 m/s
New Buildings Stream (Chainage 540m)	RB-33-13B RB-29-13B	S1-PC-01	S1-WD-17	S1 OFS : Victoria Road 1.1	S / N	0.65 m/s
				S1 OF PED: 01	S / N	0.65 m/s
				S1 OF PED: 02	S / N	0.65 m/s
				S1 OF PED: 03	S / N	0.65 m/s
				S1 OF PED: 04	S / N	0.65 m/s
Un-designated Watercourse (UD_01) (Chainage 1,330m)	RB-34-13B RB-21-13B	S1-PC-02	S1-WD-01	S1 OF PED: 07	N/A	HA107/04
				S1 OF PED: 08	N/A	HA107/04
				S1 OF PED: 09	N/A	HA107/04
Gortin Hall Drain (Chainage 2,485m)	RB-06-13B RB-28-13B	S1-PC-03	S1-WD-16	S1 OF: 40	S / N	0.65 m/s
				S1 OF PED: 12	S / N	0.65 m/s
				S1 OF PED: 12A	S / N	0.65 m/s
				S1 OF PED: 13	S / N	0.65 m/s
				S1 OF PED: 14	S / N	0.65 m/s
Un-designated Watercourse (UD_02) (Chainage 3,050m)	RB-07-13B RB-68-15 RB-22-13B	S1-PC-04	S1-WD-02	S1 OF PED: 15	N/A	HA107/04
		S1-PC-32		S1 OF PED: 16	N/A	HA107/04
				S1 OF PED: 16A	N/A	HA107/04
				S1 OF PED: 17	N/A	HA107/04
				S1 OF PED: 18	N/A	HA107/04
				S1 OF PED: 18A	N/A	HA107/04
Blackstone Burn (Chainage 3,375m)	RB-08-13B RB-23-13B	S1-PC-05	S1-WD-03	S1 OF: 26.2	S / N	0.65 m/s
				S1 OF PED: 19	S / N	0.65 m/s
				S1 OF PED: 20	S / N	0.65 m/s
				S1 OF PED: 21	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_04) (Chainage 3,900m)	RB-09-13B RB-14-13B RB-17-13B RB-24-13B	S1-PC-06	S1-WD-05	S1 OF: 05.2	S / N	0.65 m/s
		S1-PC-29		S1 OFS : Dunnalong Road 1.2	S / N	0.65 m/s
		S1-PC-37		S1 OFS : Dunnalong Road 2.1	S / N	0.65 m/s
				S1 OFS : Meenagh Road 2	S / N	0.65 m/s
				S1 OF PED: 22	S / N	0.65 m/s
				S1 OF PED: 23	S / N	0.65 m/s
				S1 OF PED: 23A	S / N	0.65 m/s
				S1 OF PED: 23B	S / N	0.65 m/s
				S1 OF PED: 24	S / N	0.65 m/s
				S1 OF PED: 24A	S / N	0.65 m/s
				S1 OF PED: 25	S / N	0.65 m/s
Un-designated Watercourse (UD_105) (Chainage 5,280m)				S1 OFS : Meenagh Road 1	U	0.65 m/s
				S1 OF PED: 26	U	0.65 m/s
Un-designated Watercourse (UD_05) (Chainage 5,800m)	RB-10-13B RB-20-13B RB-25-13(2)	S1-PC-07	S1-WD-06	S1 OF: 07.2	S / N	0.65 m/s
		S1-PC-41		S1 OFS : Tamnabrady Road.1	S / N	0.65 m/s
				S1 OFS : Cloghboy Road.1	S / N	0.65 m/s
				S1 OF PED: 27	S / N	0.65 m/s
				S1 OF PED: 29	S / N	0.65 m/s
				S1 OF PED: 30	S / N	0.65 m/s
				S1 OF PED: 31	S / N	0.65 m/s
Bready Stream (Chainage 7,600m)				S1 OFS: Bready Cut Accommodation.1	U	0.65 m/s
				S1 OFS : Donagheady Road 2.2	U	0.65 m/s
				S1 OF PED: 28	U	0.65 m/s
				S1 OF PED: 28A	U	0.65 m/s
				S1 OF PED: 32	U	0.65 m/s
				S1 OF PED: 32A	U	0.65 m/s
				S1 OF PED: 32B	U	0.65 m/s
				S1 OF PED: 32C	U	0.65 m/s
				S1 OF PED: 32D	U	0.65 m/s
				S1 OF PED: 32E	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_07) (Chainage 8,240m)	RB-11-13B RB-18-13B RB-26-13B	S1-PC-08	S1-WD-07	S1 OF: 08.1	S / N	0.65 m/s
		S1-PC-38		S1 OF: 10.2	S / N	0.65 m/s
				S1 OF PED: 34	S / N	0.65 m/s
				S1 OF PED: 35	S / N	0.65 m/s
				S1 OF PED: 36	S / N	0.65 m/s
				S1 OF PED: 37	S / N	0.65 m/s
Burndennett River (Chainage 10,500m)	RB-31-13	S1-B06		S1 OF: 11.1	H	HA107/04
				S1 OF: 12.1	S / N	0.65 m/s
				S1 OF: 13.1	N/S	0.65 m/s
				S1 OFS : Drumenny Road.1	H	HA107/04
				S1 OF PED:38	H	HA107/04
				S1 OF PED:39	S	0.65 m/s
				S1 OF PED:40	N/S	0.65 m/s
				S1 OF PED:41	S / N	0.65 m/s
				S1 OF PED:42	S / N	0.65 m/s
				S1 OF PED:43	N/S	0.65 m/s
Ballydonaghy Drain (Chainage 10,900m)	RB-12-13B RB-19-13B RB-27-13B	S1-PC-09	S1-WD-08	S1 OFS : Victoria Road 3.2	N/A	HA107/04
		S1-PC-40		S1 OF PED:44	N/A	HA107/04
				S1 OF PED:45	N/A	HA107/04
				S1 OF PED:46	N/A	HA107/04
				S1 OF PED:47	N/A	HA107/04
Un-designated Watercourse (Chainage 11,250m)				S1 OF PED:47.1	U	0.65 m/s
				S1 OF PED:48	U	0.65 m/s
Un-designated Watercourse (Chainage 11,850m)				S1 OF: 42.1	U	0.65 m/s
				S1 OF PED:49	U	0.65 m/s
				S1 OF PED:50	U	0.65 m/s
				S1 OF PED:51	U	0.65 m/s
Un-designated Watercourse (Chainage 12,400m)				S1 OF PED:52	U	0.65 m/s
				S1 OF PED:53	U	0.65 m/s
Un-designated Watercourse (Chainage 12,600m)	RB-13-13B RB-30-13B	S1-PC-10		S1 OF PED:54	N/A	HA107/04
				S1 OF PED:55	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Glenmornan River (Chainage 12,750m)	RB-32-12	S1-B08		S1 OF: 15.1	S / N	0.65 m/s
				S1 OF: 16.2	S / N	0.65 m/s
Un-designated Watercourse (Chainage 12,850m)				S1 OF PED:56	U	0.65 m/s
				S1 OF PED:57	U	0.65 m/s
Un-designated Watercourse (Chainage 13,100m)				S1 OF PED:58	U	0.65 m/s
				S1 OF PED:59	U	0.65 m/s
Un-designated Watercourse (Chainage 13,300m)				S1 OF PED: 60	U	0.65 m/s
Un-designated Watercourse (Chainage 13,500m)				S1 OF PED: 61	U	0.65 m/s
				S1 OF PED: 61.1	U	0.65 m/s
Ballymagorry Burn (Chainage 13,850m)				S1 OF: 17.1	U	0.65 m/s
				S1 OF PED: 62	U	0.65 m/s
Ballymagorry Burn (Chainage 14,800m)				S1 OF: 27.1	U	0.65 m/s
				S1 OF: 27A	U	0.65 m/s
				S1 OF: 29.1	U	0.65 m/s
				S1 OFS : Spruce Road 1	U	0.65 m/s
				S1 OF PED: 63	U	0.65 m/s
				S1 OF PED: 64	U	0.65 m/s
				S1 OF PED: 65	U	0.65 m/s
				S1 OF PED: 66	U	0.65 m/s
				S1 OF PED: 67	U	0.65 m/s
				S1 OF PED: 67A	U	0.65 m/s
				S1 OF PED: 114	U	0.65 m/s
Strabane Glen Stream (Chainage 15,470m)	RB-61-15	S1-PC-16		S1 OF: 39	S / N	0.65 m/s
				S1 OF PED: 68	S / N	0.65 m/s
				S1 OF PED: 69	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Roundhill Drain (Chainage 15,680m)	RB-58-15	S1-PC-17		S1 OF: 31.1	N/A	HA107/04
				S1 OF PED: 70	N/A	HA107/04
				S1 OF PED: 71	N/A	HA107/04
				S1 OF PED: 72	N/A	HA107/04
				S1 OF PED: 73	N/A	HA107/04
Roundhill Drain 0.01 (Chainage 15,700m)				S1 OF PED: 74	N/A	HA107/04
FD 13.b (Chainage 16,220m)	RB-41-15	S1-PC-18		S1 OF: 32.1	N/A	HA107/04
				S1 OF PED: 75	N/A	HA107/04
				S1 OF PED: 76	N/A	HA107/04
				S1 OF PED: 77	N/A	HA107/04
				S1 OF PED: 78	N/A	HA107/04
Backfence Drain (Chainage 16,650m)	RB-39-15	S1-PC-19		S1 OF PED: 79	N/A	HA107/04
				S1 OF PED: 79.1	N/A	HA107/04
Nancy Burn (Chainage 17,090m)	RB-51-15	S1-PC-20A		S1 OF: 33.1	N/A	HA107/04
	RB-53-15	S1-PC-20B		S1 OF: 34.1	N/A	HA107/04
	RB-54-15	S1-PC-20C		S1 OF PED: 80	N/A	HA107/04
	RB-55-15	S1-PC-33		S1 OF PED: 80.1	N/A	HA107/04
	RB-56-15	S1-PC-42		S1 OF PED: 81	N/A	HA107/04
Park Road Drain (Chainage 17,380m)	RB-57-15	S1-PC-22		S1 OFS : Park Road 1	N/A	HA107/04
				S1 OFS : Park Road 3	N/A	HA107/04
				S1 OF PED: 82	N/A	HA107/04
				S1 OF PED: 83	N/A	HA107/04
				S1 OF PED: 84	N/A	HA107/04
Mourne River (Chainage 17,900m)				S1 OFS : Lifford Road.1	H	HA107/04
				S1 OFS : Great Northern Link.1	H	HA107/04
				S1 OF PED: 85	H	HA107/04
				S1 OF PED: 86	H	HA107/04
				S1 OF PED: 87	H	HA107/04
UD_08 (Chainage 18,180m)	RB-70-15	S1-PC-23	S1-WD-18	S1 OF PED: 88	N/A	HA107/04
	RB-69-15			S1 OF PED: 88A	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
River Finn (Various Chainages)				S1 OF: 36.1	U	0.65 m/s
				S1 OF: 37.1	U	0.65 m/s
				S1 OF: 41	U	0.65 m/s
				S1 OF: 22.2	U	0.65 m/s
				S1 OFS : Strahans Road 1.1	U	0.65 m/s
				S1 OF PED: 89	U	0.65 m/s
				S1 OF PED: 90	U	0.65 m/s
				S1 OF PED: 93	U	0.65 m/s
				S1 OF PED: 94	U	0.65 m/s
				S1 OF PED: 98	U	0.65 m/s
				S1 OF PED: 99	U	0.65 m/s
Urney Road Drain (Chainage 18,720m)	RB-134-15 RB-135-15	S1-PC-24	S1-WD-14	S1 OF PED: 91	N/A	HA107/04
				S1 OF PED: 92	N/A	HA107/04
UD_10 (Chainage 19,230m)	RB-71-15	S1-PC-25		S1 OFS : Urney Road 2.1	U	0.65 m/s
				S1 OF PED: 95	U	0.65 m/s
				S1 OF PED: 96	U	0.65 m/s
				S1 OF PED: 97	U	0.65 m/s
				S1 OF PED: 110	U	0.65 m/s
				S1 OF PED: 111	U	0.65 m/s
Flushtown (Chainage 20,900m)	RB-45-15	S1-PC-27		S1 OF: 23.1	S / N	0.65 m/s
				S1 OF: 38	S / N	0.65 m/s
				S1 OFS : Knockroe Road 2	S / N	0.65 m/s
				S1 OFS : Orchard Road .1	S / N	0.65 m/s
				S1 OF PED: 101	S / N	0.65 m/s
				S1 OF PED: 102	S / N	0.65 m/s
				S1 OF PED: 103	S / N	0.65 m/s
				S1 OF PED: 104	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
UD_12 (Chainage 21,990m)	RB-72-15 RB-73-15	S1-PC-28	S1-WD-19	S1 OF: 24.1	S / N	0.65 m/s
				S1 OFS : Melmont Road 1.1	S / N	0.65 m/s
				S1 OFS : Melmont Road 2.2	S / N	0.65 m/s
				S1 OFS : Melmont Road 4	S / N	0.65 m/s
				S1 OF PED: 100	S / N	0.65 m/s
				S1 OF PED: 106	S / N	0.65 m/s
				S1 OF PED: 107	S / N	0.65 m/s
				S1 OF PED: 108	S / N	0.65 m/s
				S1 OF PED: 109	S / N	0.65 m/s
				S1 OF PED: 112	S / N	0.65 m/s
				S1 OF PED: 113	S / N	0.65 m/s
Undesignated Watercourse (Chainage 22,800m)				S1 OF PED: 105	U	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Table A9.2 Salmonid Habitats Details Section 2

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_13.1) (Chainage 28,100m)	RB-74-15	S2-PC-54		S2 OF: 1	N/A	HA107/04
				S2 OFS : Bells Park Road 1.1	N/A	HA107/04
				S2 OFS : Bells Park Road 2.1	N/A	HA107/04
				S2 OFS : Bells Park Road 3	N/A	HA107/04
				S2 OFS : Garden Road	N/A	HA107/04
				S2 PED OF: 2.1	N/A	HA107/04
				S2 PED OF: 2.2	N/A	HA107/04
				S2 PED OF: 2.3	N/A	HA107/04
				S2 PED OF: 2.4	N/A	HA107/04
				S2 PED OF: 2.5	N/A	HA107/04
				S2 PED OF: 2.6	N/A	HA107/04
Un-designated Watercourse (UD_15) (Chainage 29,800m)	RB-74-15 RB-75-15 RB-76-15	S2-PC-01	S1-WD-01	S2 OF: 2	S / N	0.65 m/s
			S2-WD-43	S2 OFS : Seein Road 1	S / N	0.65 m/s
				S2 OFS : Seein Road 2.1	S / N	0.65 m/s
				S2 PED OF: 5	S / N	0.65 m/s
				S2 PED OF: 6	S / N	0.65 m/s
				S2 PED OF: 7	S / N	0.65 m/s
				S2 PED OF: 4	S / N	0.65 m/s
Un-designated Watercourse (UD_16) (Chainage 30,150m)	RB-78-15 RB-79-15 RB-80-15 RB-81-05	S2-PC-48		S2 OFS : Concess Road	N/A	HA107/04
		S2-PC-55		S2 PED OF: 8	N/A	HA107/04
		S2-PC-56		S2 PED OF: 9	N/A	HA107/04
		S2-PC-58		S2 PED OF: 9.1	N/A	HA107/04
				S2 PED OF: 10	N/A	HA107/04
Un-designated Watercourse (UD_17) (Chainage 30,820m)	RB-82-15	S2-PC-02		S2 OF: 3	S / N	0.65 m/s
				S2 PED OF: 11	S / N	0.65 m/s
				S2 PED OF: 11.1	S / N	0.65 m/s
				S2 PED OF: 12	S / N	0.65 m/s
				S2 PED OF: 13	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_19) (Chainage 31,500m)	RB-83-15 RB-84-15 RB-85-15	S2-PC-03	S2-WD-33	S2 OF: 4	S / N	0.65 m/s
		S2-PC-49		S2 OFS : Stone Road 1	S / N	0.65 m/s
				S2 OFS : Stone Road 2	S / N	0.65 m/s
				S2 OFS : Urbalreagh Road	S / N	0.65 m/s
				S2 PED OF: 15	S / N	0.65 m/s
				S2 PED OF: 16.1	S / N	0.65 m/s
				S2 PED OF: 17.1	S / N	0.65 m/s
				S2 PED OF: 18	S / N	0.65 m/s
				S2 PED OF: 19	S / N	0.65 m/s
				S2 PED OF: 19.1	S / N	0.65 m/s
				S2 PED OF: 19.2	S / N	0.65 m/s
Un-designated Watercourse (Chainage 32,300m)				S2 PED OF: 20	U	0.65 m/s
				S2 PED OF: 20.1	U	0.65 m/s
Derg River (Chainage 34,300m)				S2 OF: 5	H	HA107/04
				S2 OF: 6	S	0.65 m/s
				S2 OFS : Derg Road 1	H	HA107/04
				S2 OFS : Deerpark Road 1	H	HA107/04
				S2 OFS : Deerpark Road 2	U	0.65 m/s
				S2 PED OF: 21	H	HA107/04
				S2 PED OF: 21.1	U	0.65 m/s
				S2 PED OF: 21.2	U	0.65 m/s
				S2 PED OF: 22	N	0.65 m/s
				S2 PED OF: 22.1	N	0.65 m/s
				S2 PED OF: 22.2	N	0.65 m/s
				S2 PED OF: 23	S	0.65 m/s
				S2 PED OF: 23.1	S	0.65 m/s
				S2 PED OF: 24	U	0.65 m/s
Coolaghy Burn (Chainage 36,400m)				S2 OF: 8.1	U	0.65 m/s
				S2 OFS : Maghercolton Road 0.1	U	0.65 m/s
				S2 OFS : Drumlegagh Road 1.1	U	0.65 m/s
				S2 OFS : Drumlegagh Road 2	U	0.65 m/s
				S2 OFS : Baronscourt Road 1.1	U	0.65 m/s
				S2 PED OF: 25	U	0.65 m/s
				S2 PED OF: 25.1	U	0.65 m/s
				S2 PED OF: 26	U	0.65 m/s
				S2 PED OF: 26.1	U	0.65 m/s
				S2 PED OF: 27	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Scotts Mill Layde (Chainage 37,500m)	RB-59-15 RB-60-16	S2-PC-07	S2-WD-05	S2 OF: 9	N/A	HA107/04
				S2 OFS : Baronscourt Road 2.1	N/A	HA107/04
				S2 PED OF: 28	N/A	HA107/04
				S2 PED OF: 29	N/A	HA107/04
				S2 PED OF: 30	N/A	HA107/04
				S2 PED OF: 30.1	N/A	HA107/04
				S2 PED OF: 31	N/A	HA107/04
Un-designated Watercourse (UD_21) (Chainage 38,250m)	RB-86-15	S2-PC-08	S2-WD-34	S2 OFS : Oldcastle Road 1	N/A	HA107/04
				S2 OFS : Oldcastle Road 2.1	N/A	HA107/04
				S2 PED OF: 32	N/A	HA107/04
				S2 PED OF: 32.1	N/A	HA107/04
				S2 PED OF: 33	N/A	HA107/04
				S2 PED OF: 33.1	N/A	HA107/04
Back Burn (UD_22) (Chainage 39,250m)	RB-88-15 RB-89-15	S2-PC-09		S2 OF: 10	S / N	0.65 m/s
		S2-PC-60		S2 OFS : Castletown Road 1	S / N	0.65 m/s
				S2 OFS : Glen Road 1	S / N	0.65 m/s
				S2 OFS : Glen Road 2.2	S / N	0.65 m/s
				S2 OFS : Glen Road 3	S / N	0.65 m/s
				S2 PED OF: 34	S / N	0.65 m/s
				S2 PED OF: 34.1	S / N	0.65 m/s
				S2 PED OF: 35	S / N	0.65 m/s
Un-designated Watercourse (UD_23.2) (Chainage 40,330m)				S2 OFS : Castletown Road 2	S / N	0.65 m/s
				S2 PED OF: 37	S / N	0.65 m/s
Un-designated Watercourse (UD_23) (Chainage 40,600m)	RB-90-15 RB-91-15	S2-PC-10	S2-WD-08	S2 OF: 33	S / N	0.65 m/s
				S2 OFS : Grange Road	S / N	0.65 m/s
				S2 PED OF: 38	S / N	0.65 m/s
				S2 PED OF: 39	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_24) (Chainage 41,250m)	RB-92-15	S2-PC-11		S2 OF: 34	N/A	HA107/04
				S2 OFS : West Road	N/A	HA107/04
				S2 PED OF: 41	N/A	HA107/04
				S2 PED OF: 41.1	N/A	HA107/04
				S2 PED OF: 42	N/A	HA107/04
				S2 PED OF: 43	N/A	HA107/04
Un-designated Watercourse (UD_25) (Chainage 41,590m)	RB-93-15		S2-WD-35	S2 PED OF: 45.1	N/A	HA107/04
Un-designated Watercourse (UD_26) (Chainage 41,850m)	RB-94-15 RB-95-15	S2-PC-12	S2-WD-09	S2 OF: 11	S / N	0.65 m/s
				S2 PED OF: 45	S / N	0.65 m/s
				S2 PED OF: 46	S / N	0.65 m/s
				S2 PED OF: 47	S / N	0.65 m/s
Un-designated Watercourse (UD_28) (Chainage 42,600m)	RB-96-15 RB-97-15	S2-PC-13	S2-WD-10	S2 OFS : Joes Lane 1	S / N	0.65 m/s
				S2 OFS : Joes Lane 2	S / N	0.65 m/s
				S2 PED OF: 48	S / N	0.65 m/s
				S2 PED OF: 48.1	S / N	0.65 m/s
				S2 PED OF: 49	S / N	0.65 m/s
				S2 PED OF: 49.1	S / N	0.65 m/s
				S2 PED OF: 50	S / N	0.65 m/s
Un-designated Watercourse (UD_29) (Chainage 42,850m)	RB-98-15 RB-99-15	S2-PC-14	S2-WD-36	S2 PED OF: 51	S / N	0.65 m/s
				S2 PED OF: 51.1	S / N	0.65 m/s
				S2 PED OF: 52	S / N	0.65 m/s
				S2 PED OF: 52.1	S / N	0.65 m/s
Un-designated Watercourse (Chainage 43,000m)				S2 PED OF: 53	U	0.65 m/s
				S2 PED OF: 53.1	U	0.65 m/s
Un-designated Watercourse (UD_31) (Chainage 43,150m)	RB-100-15 RB-101-15	S2-PC-16	S2-WD-41	S2 PED OF: 54	S / N	0.65 m/s
				S2 PED OF: 54.1	S / N	0.65 m/s
				S2 PED OF: 55	S / N	0.65 m/s
				S2 PED OF: 55.1	S / N	0.65 m/s
Un-designated Watercourse (UD_32) (Chainage 43,370m)	RB-102-15 RB-103-15	S2-PC-17	S2-WD-42	S2 PED OF: 57	S / N	0.65 m/s
				S2 PED OF: 57.1	S / N	0.65 m/s
				S2 PED OF: 58	S / N	0.65 m/s
				S2 PED OF: 58.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_33) (Chainage 43,780m)	RB-105-15 RB-104-15	S2-PC-18	S2-WD-37	S2 OF: 13	S / N	0.65 m/s
				S2 PED OF: 61.1	S / N	0.65 m/s
				S2 PED OF: 61.2	S / N	0.65 m/s
				S2 PED OF: 62.1	S / N	0.65 m/s
				S2 PED OF: 62.2	S / N	0.65 m/s
Un-designated Watercourse (UD_34) (Chainage 43,950m)	RB-106-15 RB-107-15	S2-PC-19	S2-WD-38	S2 OF: 35	N/A	HA107/04
				S2 PED OF: 63.1	N/A	HA107/04
				S2 PED OF: 63.2	N/A	HA107/04
				S2 PED OF: 64.1	N/A	HA107/04
				S2 PED OF: 64.2	N/A	HA107/04
Un-designated Watercourse (UD_35a, 35.1) (Chainage 44,200m)	RB-108-15 RB-109-15	S2-PC-50	S2-WD-11	S2 PED OF: 65	S / N	0.65 m/s
				S2 PED OF: 65.2	S / N	0.65 m/s
				S2 PED OF: 65.3	S / N	0.65 m/s
Un-designated Watercourse (UD_36) (Chainage 44,500m)	RB-82-15	S2-PC-20	S2-WD-13	S2 OF: 39	S / N	0.65 m/s
				S2 OFS : Killinure Road 1.1	S / N	0.65 m/s
				S2 OFS : Killinure Road 2	S / N	0.65 m/s
				S2 PED OF: 65.1	S / N	0.65 m/s
				S2 PED OF: 66	S / N	0.65 m/s
				S2 PED OF: 66.1	S / N	0.65 m/s
Un-designated Watercourse (UD_37) (Chainage 46,200m)	RB-112-15	S2-PC-21	S2-WD-14	S2 OF: 18	N/A	HA107/04
				S2 OFS : Castletown Road 1A 0.1	N/A	HA107/04
				S2 PED OF: 67	N/A	HA107/04
				S2 PED OF: 67.1	N/A	HA107/04
				S2 PED OF: 70	N/A	HA107/04
				S2 PED OF: 71	N/A	HA107/04
Un-designated Watercourse (UD_38) (Chainage 46,440m)	RB-114-15		S2-WD-15	S2 PED OF: 72	S / N	0.65 m/s
				S2 PED OF: 72.1	S / N	0.65 m/s
Un-designated Watercourse (UD_39) (Chainage 46,440m)	RB-115-15	S2-PC-22		S2 PED OF: 73	S / N	0.65 m/s
				S2 PED OF: 74.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_40 / UD_41 / UD_42 / 43.1) (Chainage 47,300m)	RB-117-15 RB-116-15 RB-118-15 RB-119-15	S2-PC-47	S2-WD-16	S2 OF: 19	S / N	0.65 m/s
		S2-PC-59	S2-WD-18	S2 OFS : Dunteige Road 1	S / N	0.65 m/s
				S2 OFS : Dunteige Road 2.1	S / N	0.65 m/s
				S2 PED OF: 74	S / N	0.65 m/s
				S2 PED OF: 75	S / N	0.65 m/s
				S2 PED OF: 76	S / N	0.65 m/s
				S2 PED OF: 77	S / N	0.65 m/s
				S2 PED OF: 78	S / N	0.65 m/s
				S2 PED OF: 78.1	S / N	0.65 m/s
Un-designated Watercourse (UD_44) (Chainage 48,150m)				S2 OFS : Rash Road 1.1	U	0.65 m/s
				S2 PED OF: 80	U	0.65 m/s
				S2 PED OF: 80.1	U	0.65 m/s
Un-designated Watercourse (UD_45) (Chainage 48,890m)	RB-120-15 RB-121-15	S2-PC-26	S2-WD-19	S2 PED OF: 81	U	0.65 m/s
				S2 PED OF: 81.1	U	0.65 m/s
				S2 PED OF: 83	U	0.65 m/s
				S2 PED OF: 83.1	U	0.65 m/s
Tully Drain (Chainage 48,950m)	RB-62-15 RB-66-15 RB-64-15 RB-63-15 RB-65-15	S2-PC-27	S2-WD-39	S2 OF: 21.1	S / N	0.65 m/s
		S2-PC-28	S2-WD-20	S2 OF: 22	S / N	0.65 m/s
		S2-PC-53		S2 OFS : Rash Road 2	S / N	0.65 m/s
				S2 OFS : Rash Road 3	S / N	0.65 m/s
				S2 OFS : Drumleagh Road	S / N	0.65 m/s
				S2 OFS :Beltany Road 1	S / N	0.65 m/s
				S2 OFS :Beltany Road 2.1	S / N	0.65 m/s
				S2 PED OF: 85	S / N	0.65 m/s
				S2 PED OF: 86.1	S / N	0.65 m/s
				S2 PED OF: 87	S / N	0.65 m/s
				S2 PED OF: 88	S / N	0.65 m/s
				S2 PED OF: 89	S / N	0.65 m/s
Fairy Water (Chainage 50,135m)	RB-40-15		S2-WD-21	S2 OF: 23.1	U	0.65 m/s
				S2 OF: 41.1	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.1	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.2	U	0.65 m/s
				S2 OFS : Bunnynubber Lane 0.3	U	0.65 m/s
				S2 PED OF: 90	U	0.65 m/s
				S2 PED OF: 90.1	U	0.65 m/s
				S2 PED OF: 92	U	0.65 m/s
				S2 PED OF: 93	U	0.65 m/s
				S2 PED OF: 93.1	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Aghnamoyle Drain (Chainage 51,025m)	RB-38-15	S2-PC-29		S2 OF: 24	N/A	HA107/04
				S2 OF: 25.1	N/A	HA107/04
				S2 OFS :Gillygooley Road 1.1	N/A	HA107/04
				S2 OFS :Aghnamoyle Road	N/A	HA107/04
				S2 PED OF: 95	N/A	HA107/04
				S2 PED OF: 95.1	N/A	HA107/04
				S2 PED OF: 96	N/A	HA107/04
				S2 PED OF: 97	N/A	HA107/04
				S2 PED OF: 98	N/A	HA107/04
				S2 PED OF: 99	N/A	HA107/04
Un-designated Watercourse (UD_50) (Chainage 52,700m)	RB-120-15		S2-WD-25	S2 PED OF: 100	S / N	0.65 m/s
				S2 PED OF: 101	S / N	0.65 m/s
Un-designated Watercourse (UD_52) (Chainage 53,200m)	RB-123-15 RB-124-15	S2-PC-32	S2-WD-40	S2 OFS :Tamlaght Road 1	S / N	0.65 m/s
				S2 PED OF: 102	S / N	0.65 m/s
				S2 PED OF: 104	S / N	0.65 m/s
				S2 PED OF: 105	S / N	0.65 m/s
				S2 PED OF: 105.1	S / N	0.65 m/s
Un-designated Watercourse (Chainage 53,350m)				S2 PED OF: 106	U	0.65 m/s
				S2 PED OF: 106.1	U	0.65 m/s
				S2 PED OF: 107	U	0.65 m/s
Un-designated Watercourse (UD_54) (Chainage 53,700m)	RB-125-15 RB-126-15 RB-127-15	S2-PC-34	S2-WD-26	S2 OFS :Brookmount Road	S / N	0.65 m/s
		S2-PC-51		S2 PED OF: 108	S / N	0.65 m/s
				S2 PED OF: 109	S / N	0.65 m/s
				S2 PED OF: 109.2	S / N	0.65 m/s
Fireagh Drain (Chainage 53,900m)	RB-43-15 RB-44-15 RB-42-15	S2-PC-36	S2-WD-27	S2 OF: 27	S / N	0.65 m/s
		S2-PC-57		S2 OF: 29	S / N	0.65 m/s
				S2 OFS :Clanabogan Road 1	S / N	0.65 m/s
				S2 OFS :Clanabogan Road 2	S / N	0.65 m/s
				S2 PED OF: 111	S / N	0.65 m/s
				S2 PED OF: 112	S / N	0.65 m/s
				S2 PED OF: 113	S / N	0.65 m/s
				S2 PED OF: 113.1	S / N	0.65 m/s
Un-designated Watercourse (UD_55) (Chainage 54,320m)	RB-129-15 RB-128-15	S2-PC-38	S2-WD-28	S2 OFS :Loughmuck Road	N/A	HA107/04
				S2 PED OF: 114	N/A	HA107/04
				S2 PED OF: 115	N/A	HA107/04
				S2 PED OF: 115.1	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (Chainage 55,000m)				S2 PED OF: 116	S / N	0.65 m/s
Un-designated Watercourse (UD_56) (Chainage 55,250m)	RB-130-15 RB-131-15	S2-PC-39	S2-WD-29	S2 OF: 37	N/A	HA107/04
				S2 PED OF: 117	N/A	HA107/04
				S2 PED OF: 117.1	N/A	HA107/04
				S2 PED OF: 118	N/A	HA107/04
Loughmuck (Chainage 56,000m)	RB-50-15 RB-48-15 RB-49-15	S2-PC-43	S2-WD-30	S2 OF: 38.1	N/A	HA107/04
		S2-PC-44		S2 OFS :Beagh Road 1	N/A	HA107/04
				S2 OFS :Beagh Road 2	N/A	HA107/04
				S2 OFS :Ballynahatty Road 2	N/A	HA107/04
				S2 PED OF: 119	N/A	HA107/04
				S2 PED OF: 121	N/A	HA107/04
				S2 PED OF: 122	N/A	HA107/04
				S2 PED OF: 122.1	N/A	HA107/04
				S2 PED OF: 123	N/A	HA107/04
				S2 PED OF: 123.1	N/A	HA107/04
				S2 PED OF: 124	N/A	HA107/04
				S2 PED OF: 124.1	N/A	HA107/04
				S2 PED OF: 125	N/A	HA107/04
				S2 PED OF: 125.1	N/A	HA107/04
Drumragh (Chainage 56,580m)				S2 OF: 30	N	0.65 m/s
				S2 OF: 31.1	N	0.65 m/s
				S2 OFS :Ballynahatty Road 1	H	HA107/04
				S2 PED OF: 126	H	HA107/04
				S2 PED OF: 127	H	HA107/04
Un-designated Watercourse (UD_57) (Chainage 56,900m)				S2 OFS :Blackfort Road 1	U	0.65 m/s
				S2 PED OF: 128	U	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Freughmore Drain (Chainage 57,300m)	RB-46-15 RB-47-15	S2-PC-45	S2-WD-31	S2 OF: 32	S / N	0.65 m/s
				S2 OFS :Blackfort Road 2	S / N	0.65 m/s
				S2 OFS :Drumragh Road	S / N	0.65 m/s
				S2 PED OF: 130	S / N	0.65 m/s
				S2 PED OF: 130.1	S / N	0.65 m/s
				S2 PED OF: 131	S / N	0.65 m/s
				S2 PED OF: 132	S / N	0.65 m/s
				S2 PED OF: 133	S / N	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Table A9.3 Salmonid Habitats Details Section 3

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Drumragh (Chainage 61,800m)				S3 OFS : Seskinore Road 1	N	0.65 m/s
				S3 PED OF: 01.1	N	0.65 m/s
				S3 PED OF: 01.4	N	0.65 m/s
Un-designated Watercourse (UD_57.2, UD_57.3) (Chainage 61,850m)	RB-132-15 RB-133-15 RB-44b-13 RB-44-13	S3-PC-56	S3-WD-32	S3 OFS : Seskinore Road 2.2	S / N	0.65 m/s
		S3-PC-84	S3-WD-66	S3 PED OF: 01	S / N	0.65 m/s
				S3 PED OF: 01.2	S / N	0.65 m/s
				S3 PED OF: 01.3	S / N	0.65 m/s
				S3 PED OF: 01.5	S / N	0.65 m/s
				S3 PED OF: 01.6	S / N	0.65 m/s
				S3 PED OF: 01.7	S / N	0.65 m/s
				S3 PED OF: 01.8	S / N	0.65 m/s
				S3 PED OF: 02	S / N	0.65 m/s
				S3 PED OF: 02.1	S / N	0.65 m/s
Un-designated Watercourse (UD_58, UD_108) (Chainage 62,550m)	RB-40b-13B RB-40-13 RB-40c-13B RB-73-13B	S3-PC-51	S3-WD-43	S3 OF: 21	N/A	HA107/04
			S3-WD-44	S3 OFS : Doogary Road 1	N/A	HA107/04
			S3-WD-70	S3 OFS : Doogary Road 2	N/A	HA107/04
				S3 PED OF: 03	N/A	HA107/04
				S3 PED OF: 03.1	N/A	HA107/04
				S3 PED OF: 03.2	N/A	HA107/04
				S3 PED OF: 03.3	N/A	HA107/04
				S3 PED OF: 03.4	N/A	HA107/04
				S3 PED OF: 04	N/A	HA107/04
				S3 PED OF: 04.1	N/A	HA107/04
				S3 PED OF: 04.2	N/A	HA107/04
				S3 PED OF: 05	N/A	HA107/04
Un-designated Watercourse (UD_109) (Chainage 64,080m)	RB-41-13B RB-41b-13B	S3-PC-52	S3-WD-45	S3 PED OF: 07	S / N	0.65 m/s
				S3 PED OF: 07.1	S / N	0.65 m/s
				S3 PED OF: 08	S / N	0.65 m/s
				S3 PED OF: 08.1	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Ranelly Drain 0.5 (Chainage 64,390m)	RB-42-13B RB-50-13B RB-89-13B RB-42-13B	S3-PC-53 S3-PC-74 S3-PC-82	S3-WD-46	S3 OF: 2.1	S / N	0.65 m/s
				S3 OFS : Drumconnelly Road.2	S / N	0.65 m/s
				S3 OFS : Drumconnelly Road 2	S / N	0.65 m/s
				S3 PED OF: 09	S / N	0.65 m/s
				S3 PED OF: 09.1	S / N	0.65 m/s
				S3 PED OF: 10	S / N	0.65 m/s
				S3 PED OF: 11	S / N	0.65 m/s
				S3 PED OF: 11.1	S / N	0.65 m/s
				S3 PED OF: 11.2	S / N	0.65 m/s
				S3 PED OF: 11.3	S / N	0.65 m/s
				S3 PED OF: 11.4	S / N	0.65 m/s
				S3 PED OF: 11.5	S / N	0.65 m/s
				S3 PED OF: 11.6	S / N	0.65 m/s
				S3 PED OF: 12	S / N	0.65 m/s
Ranelly Drain (Ranelly Drain 1, Ranelly Drain 1.1, UD_119) (Chainage 64,980m)	RB-52-13B RB-52c-13B RB-52b-13B	S3-PC-06	S3-WD-04	S3 OF: 22.2	S / N	0.65 m/s
			S3-WD-05	S3 PED OF: 13	S / N	0.65 m/s
				S3 PED OF: 13.1	S / N	0.65 m/s
				S3 PED OF: 13.2	S / N	0.65 m/s
Ranelly Drain (Ranelly Drain 2, Ranelly Drain 2.1, Ranelly Drain 2.3, Ranelly Drain 3, Ranelly Drain 3.1) (Chainage 65,650m)	RB-53-13B RB-54-13B RB-55-13B RB-53b-13B RB-54b-13B RB-54c-13B RB-55b-13B RB-69-13B	S3-PC-07 S3-PC-08 S3-PC-10	S3-WD-06	S3 OF: 3.3	S / N	0.65 m/s
			S3-WD-07	S3 OFS : Tullyrush Road Lane 1	S / N	0.65 m/s
			S3-WD-08	S3 OFS : Tullyrush Road Lane 2.3	S / N	0.65 m/s
			S3-WD-09	S3 PED OF: 14	S / N	0.65 m/s
			S3-WD-10	S3 PED OF: 15	S / N	0.65 m/s
				S3 PED OF: 15.1	S / N	0.65 m/s
				S3 PED OF: 16	S / N	0.65 m/s
				S3 PED OF: 16.1	S / N	0.65 m/s
				S3 PED OF: 16.2	S / N	0.65 m/s
				S3 PED OF: 18	S / N	0.65 m/s
Un-designated Watercourse (UD_60) (Chainage 66,870m)	RB-56-13B RB-56b-13	S3-PC-11	S3-WD-75	S3 OF: 4.1	N/A	HA107/04
				S3 OFS : Rarone Road 1	N/A	HA107/04
				S3 OFS : Rarone Road 2.1	N/A	HA107/04
				S3 OFS : Rarone Road 3	N/A	HA107/04
				S3 OFS : Rarone Road 4	N/A	HA107/04
				S3 PED OF: 20	N/A	HA107/04
				S3 PED OF: 20.1	N/A	HA107/04
				S3 PED OF: 20.2	N/A	HA107/04
				S3 PED OF: 20.3	N/A	HA107/04
				S3 PED OF: 20.4	N/A	HA107/04

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_61) (Chainage 67,650m)	RB-57-13B RB-57b-13B	S3-PC-12	S3-WD-11	S3 OFS : Drumconnelly Road 4	S / N	0.65 m/s
				S3 PED OF: 21	S / N	0.65 m/s
				S3 PED OF: 21.1	S / N	0.65 m/s
				S3 PED OF: 22	S / N	0.65 m/s
				S3 PED OF: 23	S / N	0.65 m/s
				S3 PED OF: 23.1	S / N	0.65 m/s
Letfern (UD_61.2) (Chainage 68,650m)	RB-58-13B	S3-PC-14	S3-WD-12	S3 OF: 5.1	S / N	0.65 m/s
	RB-59-13B	S3-PC-15	S3-WD-47	S3 OFS : Moylagh Road 1	S / N	0.65 m/s
	RB-45-13	S3-PC-58	S3-WD-48	S3 OFS : Moylagh Road 2	S / N	0.65 m/s
	RB-59b-13B	S3-PC-66		S3 PED OF: 24	S / N	0.65 m/s
	RB-58b-13B			S3 PED OF: 24.1	S / N	0.65 m/s
	RB-58c-13B			S3 PED OF: 25	S / N	0.65 m/s
				S3 PED OF: 26	S / N	0.65 m/s
				S3 PED OF: 27.1	S / N	0.65 m/s
				S3 PED OF: 27.2	S / N	0.65 m/s
				S3 PED OF: 28	S / N	0.65 m/s
				S3 PED OF: 28.1	S / N	0.65 m/s
Un-designated Watercourse (UD_62 / UD_63) (Chainage 69,700m)	RB-60-13B	S3-PC-16	S3-WD-13	S3 PED OF: 29	N/A	HA107/04
	RB-61-13B	S3-PC-17	S3-WD-14	S3 PED OF: 31	N/A	HA107/04
	RB-60b-13B			S3 PED OF: 31.1	N/A	HA107/04
	RB-61b-13B			S3 PED OF: 33	N/A	HA107/04
				S3 PED OF: 33.1	N/A	HA107/04
				S3 PED OF: 34	N/A	HA107/04
Un-designated Watercourse (UD_65 / UD_66) (Chainage 70,200m)	RB-62-13	S3-PC-18	S3-WD-16	S3 OF: 6.1	N/A	HA107/04
	RB-62b-13B		S3-WD-17	S3 PED OF: 35	N/A	HA107/04
	RB-70-13B			S3 PED OF: 36	N/A	HA107/04
				S3 PED OF: 36.1	N/A	HA107/04
				S3 PED OF: 37	N/A	HA107/04
				S3 PED OF: 38	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_67, UD_67A) (Chainage 71,100m)	RB-35B-13B RB-35B-13B RB-35B-13B RB-39-13 RB-51-13	S3-PC-19 S3-PC-50 S3-PC-83	S3-WD-18 S3-WD-19	S3 OF: 23.1	S / N	0.65 m/s
				S3 OFS : Greenmount Road	S / N	0.65 m/s
				S3 OFS : Greenmount Road Lane.1	S / N	0.65 m/s
				S3 OFS : Greenmount Road Lane 2	S / N	0.65 m/s
				S3 PED OF: 39	S / N	0.65 m/s
				S3 PED OF: 40	S / N	0.65 m/s
				S3 PED OF: 41	S / N	0.65 m/s
				S3 PED OF: 42	S / N	0.65 m/s
				S3 PED OF: 42.1	S / N	0.65 m/s
				S3 PED OF: 43	S / N	0.65 m/s
				S3 PED OF: 44	S / N	0.65 m/s
				S3 PED OF: 45	S / N	0.65 m/s
Routing Burn (Chainage 71,700m)				S3 OF: 7	H	HA107/04
				S3 OFS : Routing Burn Lane 1	H	HA107/04
				S3 OFS : Routing Burn Lane 2.1	H	HA107/04
				S3 PED OF: 46	H	HA107/04
				S3 PED OF: 47	H	HA107/04
Un-designated Watercourse (UD_68) (Chainage 72,090m)	RB-36-13B RB-36b-13B	S3-PC-21	S3-WD-20	S3 PED OF: 51	S / N	0.65 m/s
				S3 PED OF: 51.1	S / N	0.65 m/s
				S3 PED OF: 51.2	S / N	0.65 m/s
Un-designated Watercourse (UD_69) (Chainage 72,380m)	RB-37-13B RB-37b-13B	S3-PC-22	S3-WD-21	S3 OF: 24.1	S / N	0.65 m/s
				S3 PED OF: 52	S / N	0.65 m/s
				S3 PED OF: 52.1	S / N	0.65 m/s
				S3 PED OF: 52.2	S / N	0.65 m/s
				S3 PED OF: 53	S / N	0.65 m/s
				S3 PED OF: 54	S / N	0.65 m/s
Un-designated Watercourse (UD_70) (Chainage 73,000m)	RB-71-13B		S3-WD-22	S3 PED OF: 55	S / N	0.65 m/s
				S3 PED OF: 56	S / N	0.65 m/s
				S3 PED OF: 57	S / N	0.65 m/s
Un-designated Watercourse (UD_71) (Chainage 73,770m)	RB-38-13B RB-38b-13B	S3-PC-23	S3-WD-49	S3 OF: 8.1	S / N	0.65 m/s
				S3 OFS : Springhill Road	S / N	0.65 m/s
				S3 PED OF: 58	S / N	0.65 m/s
				S3 PED OF: 58.1	S / N	0.65 m/s
				S3 PED OF: 59	S / N	0.65 m/s
Un-designated Watercourse (UD_72, UD_72.2) (Chainage 74,100m)	RB-47-13B RB-48-13B	S3-PC-64 S3-PC-65		S3 PED OF: 60	S / N	0.65 m/s

Watercourse	Section 46 ID	Culvert / Structure ID	Watercourse Diversion ID	Outfalls	Receiving Watercourse Salmonid Habitat *(See Note 1)*	Limiting Discharge Velocity into Watercourse
Un-designated Watercourse (UD_110, UD_110.1, UD_110.2, UD_110.3) (Chainage 74,900m)	RB-43-13B	S3-PC-54	S3-WD-50	S3 OF: 9.1	S / N	0.65 m/s
	RB-46-13B	S3-PC-60	S3-WD-51	S3 OF: 10	S / N	0.65 m/s
	RB-49-13B	S3-PC-72		S3 OFS : Tullanafoile Road	S / N	0.65 m/s
	RB-43b-13B			S3 OFS : Tullanafoile Road 2	S / N	0.65 m/s
	RB-49b-13B			S3 PED OF: 61	S / N	0.65 m/s
				S3 PED OF: 61.1	S / N	0.65 m/s
				S3 PED OF: 62	S / N	0.65 m/s
				S3 PED OF: 63	S / N	0.65 m/s
				S3 PED OF: 64	S / N	0.65 m/s
				S3 PED OF: 64.1	S / N	0.65 m/s
				S3 PED OF: 65	S / N	0.65 m/s
				S3 PED OF: 65.1	S / N	0.65 m/s
				S3 PED OF: 66	S / N	0.65 m/s
Un-designated Watercourse (UD_75, UD_75.3, UD_113.1) (Chainage 77,000m)		S3-PC-55	S3-WD-53	S3 OFS : Tycanny Road 2.1	S / N	0.65 m/s
			S3-WD-54	S3 OFS : Tycanny Road 3	S / N	0.65 m/s
				S3 PED OF: 66.1	S / N	0.65 m/s
				S3 PED OF: 66.2	S / N	0.65 m/s
				S3 PED OF: 67	S / N	0.65 m/s
				S3 PED OF: 68	S / N	0.65 m/s
				S3 PED OF: 68.1	S / N	0.65 m/s
Un-designated Watercourse (UD_76, UD_78) (Chainage 78,210m)		S3-PC-29			S / N	0.65 m/s

Key

S Spawning
N Nursery
H Holding
U Unclassified
N/A No Salmonid interest

Notes:

1 Salmonid Habitat for the River Finn and associated catchment have been categorised by Loughs Agency.

Appendix 10 - Statutory Consultee Agreement Communication

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Northern Ireland Environment Agency
www.daera-ni.gov.uk

Natural Environment Division
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast
BT7 2JA

Telephone: 028 9056 9812

Mr Seamus Keenan
DFI Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

Our Ref: DC/LJ A5

17 October 2017

Dear Mr Keenan,

Re: A5WTC Appropriate Assessment

NIEA CDP has considered the consultation on the Habitats Regulations Assessments (HRAs) relating to the proposed A5 Western Transport Corridor received on 24 August 2017 and discussed at a meeting held on 6 September 2017 and makes the following comments.

NIEA CDP previously queried drainage from the scheme, both during construction and operation, which will ultimately be to the River Foyle and Tributaries SAC/ASSI. The HRA documents reference a measure of 50 mg/l for total suspended solids to be placed on any discharge consent and that the Water Framework Directive measures will be incorporated. It is advised that the rationale and appropriateness of this value are explicitly included in the document given the status of the receiving water body as an SAC in part of spawning Atlantic salmon. The highest possible level of protection should be afforded to the SAC rivers and justification provided that no unnaturally high levels of suspended solids will be introduced.

The documents include proposed use of rip-rap constructed from gabion mattresses. Concerns previously raised surrounded the use in high energy rivers where there is a risk that structures can become damaged leading to loss of contents to the extent they can form fish traps leading to adverse effects on fish species including Atlantic salmon. Consideration of this has not been made. It is advisable that alternatives to gabion baskets should be investigated. Further to this, clarification should be provided regarding clear span bridges – if these are clear span then protective measures such as gabion baskets should not be required.

The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205 metres. Air quality modelling has been undertaken using ADMS Roads. All works associated with the appropriate section will be carried out within 500 metres of the SAC. The initial modelling indicated that nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was indicated as being an error in modelling and an explanation has been

provided. The rationale within this document should clearly explain the parameters which have affected the results given its public availability.

The current modelling indicates that deposition would be between 0.2 and 0.4% of the critical load for the site. In line with current policies NIEA CDP considers the modelled values to be insignificant.

If you require any further information please contact Lee Jones on the above number.

Yours sincerely,

Keith Finegan
Authorised Officer

Cc: Manny Gault - Client Project Manager - A5 WTC – (email)

Subject: FW: 2017-06-05_SI to DAHG_HRA Consultation

From: Manager Dau [mailto:Manager.Dau@chg.gov.ie]
Sent: 02 October 2017 12:02
To: Ireland, Stuart <Stuart.Ireland@wsp.com>
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Hi Stuart,

The Department has no further nature conservation comments in relation to the updated documents.

Kind regards,

Yvonne

Yvonne Nolan
Development Applications Unit
Department of Culture, Heritage, and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

(053) 9117382

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

From: Ireland, Stuart [mailto:Stuart.Ireland@wsp.com]
Sent: 02 October 2017 10:13
To: Manager Dau
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Dear Yvonne,

As you may be aware, the 3rd consultation on the A5 Western Transport Corridor, Habitats Regulations Assessments, closes today.

Could you please let me know if NPWS has any comments to make in realtion to the updated documents?

Kind regards,

Stuart

Stuart Ireland ***BSc (Hons) CEnv MCIEEM***
Associate

stuart.ireland@wsp.com

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Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

DfI Roads Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

08 November 2017

Dear Sir/Madam

RE: 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment.

Thank you for your recent correspondence in relation to the above-mentioned proposed development. The Loughs Agency is the statutory body charged with the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

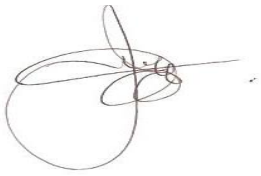
The Loughs Agency has considered the information provided in the 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment and would have no further comments at this stage.

Yours sincerely

22 Victoria Road, Prehen, Londonderry, BT47 2AB
Tel: 028 71 342100 Fax: 028 71 342720 Txt Phone: 028 71 318000
www.loughs-agency.org

Loughs Agency

Gníomhaireacht na Lochanna
Factrie fur Loughs



John McCartney
Director of Conservation & Protection

22 Victoria Road, Prehen, Londonderry, BT47 2AB
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www.loughs-agency.org

Habitats Regulations Assessment

Report of Information to Inform an Appropriate Assessment:

718736-3000-R-022 Tully Bog Special Area of Conservation

A5 Western Transport Corridor

November 2017

Produced for

Department for Infrastructure

Prepared by

Project Office:
WSP
Shorefield House
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Document Control Sheet

Project Title	A5 Western Transport Corridor
Report Title	Habitats Regulations Assessment Report of Information to Inform an Appropriate Assessment: Tully Bog Special Area of Conservation
Document Ref	718736-3000-R-022
Revision	6
Status	Final
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Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
1	Draft	S. Ireland	10.09.14	P. Reid	23.09.14	P. Reid	30.09.14
2	Draft	S. Ireland	15.10.14	P. Reid	15.10.14	P. Reid	15.10.14
3	Draft	S. Ireland	20.10.14	P. Reid	20.10.14	P. Reid	20.10.14
4	Draft	S. Ireland	15.03.17	J. O'Neil	23.03.17	P. Edwards	31.03.17
5	Draft for 3rd Consultation	S. Ireland A. Bascombe	11.08.17	B. Walker	11.08.17	P. Edwards	18.08.17
6	Final	S. Ireland	03.11.17	B. Walker	09.11.17	P. Edwards	15.11.17

Distribution

Organisation	Contact	Copies
Department for Infrastructure	Seamus Keenan	1
NIEA	David Chambers – Conservation Designations and Protection Planning Response Team	1 1
National Parks and Wildlife Service	Yvonne Nolan	1
Publication		Deposit locations

Schedule of Changes

The following table outlines the updates made to the Report of Information to Inform Appropriate Assessment: Tully Bog Special Area of Conservation, on receipt of comments received in response to the 3rd consultation concluding in October 2017.

Section Edited	Update
Front Cover	Contact details
Document Control Sheet	Revision, Status, Record of Issue details, Distribution details, Footnote moved to Section 1
1.1.1, 1.1.6, 7.1.3, and footnote 1	Minister amended to Competent Authority
1.1.1	Guidance text refined and footnote added
1.1.2	Guidance text refined and minor text amendment for clarity
1.1.5	Minor text amendment for clarity
1.1.6	Minor text amendment for clarity
1.2.1	Text deleted to avoid repetition
1.2.2	Additional text added to clarify links to national primary road network in the Republic of Ireland, other minor text amendment for clarity
1.2.3	Minor text amendment for clarity
Footnote 5 and 6	Minor text amendment for clarity
1.3.3	Minor text amendment for clarity
1.3.5	Minor text amendment for clarity
1.3.6	Minor text amendment for clarity and qualifications of reviewers added
2.2.1	Guidance text refined
2.2.3	Minor text amendment for clarity in Title
2.2.8	Minor text amendment for clarity
3.1.1	Table number corrected
Footnote 8	Minor text amendment for clarity
Table 3.1	Minor text amendment for clarity under Description of project (size and scale) and Description of avoidance and/or mitigation measures
Table 3.1	Cross reference added to Statutory Consultee agreement communication
Section 4, 4.1 and 4.2	Header, Introduction text added, subtitle updated. Subsequent paragraph numbering amended through sections 3 and 4
4.2.2	APIS website added and minor text amendment for clarity regarding modelling

Section Edited	Update
4.2.6	Data source and footnote added
4.3.1	Minor text amendment for clarity
5.1.2	Typo corrected
5.1.5	Minor text amendment for clarity
Table 5.1	Minor text amendment for clarity in title – updated to Table 5.1 from 4.1
Section 6 and 7	Scientific units within text updated to add clarity
6.1.1	Minor text amendment for clarity
6.1.4	Guidance text refined and typo corrected. Footnote 11 added for clarity.
6.5.2	Minor text amendment for clarity
6.5.4	Minor text amendment for clarity
6.7.1	Typo corrected and minor text amendment for clarity
6.7.2	Paragraph added reflecting existing conditions
6.8.1	Minor text amendments for clarity
6.8.7	Explanatory footnotes added
7.3.1	Explanatory footnotes added
7.3.6	Typo corrected
7.4.4	APIS Nitrogen deposition data expanded
7.4.7	Paragraph added clarifying requirements of DMRB HA207/07
7.4.8	Text moved to 7.4.11
7.4.8	Minor text amendments for clarity
7.4.9	Minor text amendments for clarity
7.4.10	Minor text amendments for clarity
7.4.11	Typos corrected and 7.4.12 amalgamated
7.4.12	Minor text amendments for clarity
Table 7.1	Table reference updated
Table 7.3	Table reference updated, titles amended for clarity, notes and abbreviation explanations added
7.4.18	Previous text replaced providing further information on comparison of Nitrogen deposition against current background levels added, cross reference updated, other minor text amendments for clarity
7.4.19	Previous text replaced providing further clarification
Figure 7.1 and 7.2	Graphs added for clarity

Section Edited	Update
7.4.19	Minor text amendments for clarity and typos corrected
7.4.20	Minor text amendments for clarity
7.4.21	Paragraph removed
7.4.22	New paragraph added
7.4.23	Minor text amendments for clarity
7.4.26	Typos corrected
7.6.1	Minor text amendment for clarity and Non-technical footnote added
7.6.2	Minor text amendment for clarity
7.6.4	Added text
7.6.5 and Table 7.4	Added table for clarity following consultation on 3rd Draft and amended text to reference information presented
7.7.1	Engineered screens added to consideration
7.7.2	Added text
7.7.3 – 7.7.5	Added text
7.7.7	Minor text amendment for clarity
8.1.1 & References	Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 – typo corrected and ROI regulation update.
8.1.3	Paragraph deleted, no longer relevant
8.1.3	Bullet regarding Departments commitments added
References	References added subsequent to addition of paragraph 7.7.3
Appendix 7	New appendix providing Statutory Consultee agreement communications

Contents

Appendices

Tables

Figures

1 Introduction

1.1.1 This document is a Habitats Regulation Assessment (HRA)[1] which contains information to be submitted to the 'Competent Authority' in order to inform the statutory assessments required under The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 (as amended[2]), (The Regulations) for the proposed A5 Western Transport Corridor (A5WTC) Scheme.

1.1.2 Following consultation with Northern Ireland Environment Agency (NIEA) and National Parks & Wildlife Service (NPWS) in the Republic of Ireland ten sites were identified as ones which should be considered in accordance with the requirements of the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive') and Regulations:

- River Foyle and Tributaries SAC
- River Finn (Republic of Ireland) SAC
- Owenkillew River SAC
- Tully Bog SAC
- Lough Swilly (including former Inch Lough and Levels) SPA
- Lough Foyle SPA (Northern Ireland)
- Lough Foyle SPA (Republic of Ireland)
- Lough Neagh and Lough Beg SPA
- Lough Foyle Ramsar Site
- Lough Neagh & lough Beg Ramsar Site

[1] The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995, as amended (the Habitats Regulations) indicate that the person or organisation applying for any consent, permission or other authorisation, known as the 'Project Proponent', is responsible for provision of information to support decisions by the 'Competent Authority' on the need for Appropriate Assessment and to allow the Appropriate Assessment to be undertaken. The 'Project Proponent' is taken to mean the project team, including as appropriate: Overseeing Organisation scheme or area staff; design consultants; contractors; Design Build Finance and Operate (DBFO) companies; and managing agents.

[2] As amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012

1.1.3 This document (HRA – Tully Bog SAC) is one of four reports to inform the Appropriate Assessment, and specifically addresses Tully Bog SAC.

1.1.4 A further three documents have been produced, namely:

- HRA Report – SAC Watercourses (River Foyle & Tributaries SAC; River Finn SAC and Owenkillew SAC);
- HRA Report - SPAs (for Lough Swilly SPA; Lough Foyle SPA; and Lough Neagh and Lough Beg SPA; and
- Ramsar Site Assessment Report[3] (for Lough Foyle Ramsar Sites (NI and RoI); and Lough Neagh and Lough Beg Ramsar Site.

1.1.5 A first draft of this report was published for consultation in 2014 and responses were received at that time. The content of those responses, and any design changes which arose from the 2016 Public Inquiry into the Proposed Scheme, were taken into account in developing two further draft reports, which was published for consultation in April 2017 and August 2017 in which the general public were also invited to provide responses[4].

1.1.6 The Northern Ireland Environment Agency (NIEA) as part of the Department of Agriculture, Environment, and Rural Affairs (DAERA) as statutory consultee for the designated sites in Northern Ireland (NI) and the National Parks and Wildlife Service (NPWS) (as a statutory consultee for the Republic of Ireland) were consulted throughout the development stages of this report. Comments received from these bodies, as well as information and relevant comments received from public consultation, have been addressed and incorporated in this final report, which will be considered by Department for Infrastructure (DfI) as the Competent Authority when undertaking the Appropriate Assessment required in advance of a decision to proceed or not with the Scheme, in accordance with the requirements of the Directive and the Regulations.

1.2 Background

1.2.1 The A5WTC is one of five key transport corridors making up the strategic road network across Northern Ireland. The Department for Infrastructure (DfI) is promoting the dualling of the A5WTC as part of its improvement programme. This project would significantly improve safety

[3] Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites

[4] The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (to which the UK is a signatory) requires [at Article 3]:- '*Each Party shall promote environmental education and environmental awareness among the public, especially on how to obtain access to information, to participate in decision-making and to obtain access to justice in environmental matters'.*

and journey times along this route and, in addition to improving the links between the urban centres in the west of the province, provide a strategic link with international gateways. It passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy.

1.2.2 The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal connects to the national primary road network in the Republic of Ireland at 2 locations, the N14/N15 roads at Strabane/Lifford into Co. Donegal and the N2 at Aughnacloy into Co. Monaghan. Donegal County Council are promoting a new road which connects the A5WTC to the N15 just south of Lifford and this connectivity has been developed in co-operation with the A5WTC project team. These proposals have been progressed through the statutory process and the decision to proceed will be confirmed so that construction and opening to traffic coincides with the opening of the A5WTC around Strabane. This scheme crosses the River Finn SAC and the proposals have been subject to HRA within the Republic and considered under the cumulative effects section of the relevant WSP reports (see 1.1.2 above). Proposals to upgrade the N2 are currently on hold and any impacts on the A5WTC at the border in Co. Monaghan cannot be assessed at this point in time, though this location nor the consequences of change at this location are considered as not affecting any of the Natura 2000 sites considered in these Reports.

1.2.3 It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown in Appendix 1:

- Phase 1a: Junctions 1-3 (New Buildings – north of Strabane) and Phase 1b: Junctions 13-15 (south of Omagh – A4,Ballygawley) between 2017 and 2019;
- Phase 2: Junctions 3-13 (north of Strabane – south of Omagh) between 2021 and 2023; and
- Phase 3: Junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.

1.2.4 The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft HRA which recognised and screened[5] the above European Designated Special Areas

[5] The SACs and SPAs were subject to a screening exercise (Test of Likely Significance (ToLS) to determine if the proposed scheme, with its proposed and committed mitigation measures, would be likely to have a significant effect on the integrity of any of the sites considered. The ToLS process is commonly referred to as Stage 1 of the Habitats Regulations Assessment (HRA) process. When completed, the ToLS concluded the impacts of the proposed scheme (subject to mitigation) would not be likely to have a significant effect upon the integrity of the implicated designated sites in the context of the Habitats or Birds Directives, a conclusion which was agreed with by NIEA, the statutory consultee relative to the designated sites in Northern Ireland and the

of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. A judicial review of the scheme in 2013 found the ES to be robust, but upheld a challenge that the HRA reporting relating to the Habitats Regulations should have been taken to the next level, namely a Stage 2 assessment[6].

1.2.5 Further studies have since been completed to address this need for a more robust habitats regulations assessment, and a new Environmental Statement (A5WTC ES 2016) was prepared and published based on this information.

1.2.6 The 2016 Environmental Statement (ES), along with the draft vesting orders and other statutory procedures, were subject to a Public Inquiry from October to December 2016. Accordingly, the production of the current suite of HRA Reports have been programmed to ensure they contain the most up to date information.

1.3 Preparation of the HRA

1.3.1 The primary author of this report is Stuart Ireland B.Sc. (Hons), MCIEEM, CEnv. He is expert in ecological matters and the full spectrum of environmental assessment techniques, methodologies and statutes. Academically, he holds a combined honours degree in Zoology with Marine Zoology from UCNW Bangor, and professionally, is a member of relevant Institutes requiring the highest standards of professional competence and integrity. He is a Chartered Environmentalist, and a full member of the Chartered Institute of Ecology and Environmental Management.

1.3.2 Stuart has practised for 17 years, during which time he has undertaken complex Ecological Impact assessments, Habitats Regulations Assessments for nationally important infrastructure schemes. He has been involved with the A5WTC proposal since its inception in 2008 and is familiar with both the proposal site and the full spectrum of environmental parameters which have influenced the design of the proposal.

1.3.3 Stuart has provided ecological advice services for major road schemes, including the Roscommon Way Extension scheme in Essex, ensuring that construction of a flood relief road

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NPWS the organisation charged with the implementation of the Habitats and Birds Directives in the ROI. However new case law on the interpretation of 'likelihood' and additional information provided by the Loughs Agency, resulted in a need to re-screen the sites (see footnote 6).

[6] The challenge to the consent for the proposed scheme was made in the context that potential impacts upon the River Foyle and Tributaries SAC should have been subject to Stage 2 of the Habitats Regulations Assessment (Appropriate Assessment). This challenge was upheld. The finding was informed by concerns raised by Loughs Agency in responses to the 2010 ES and presented in verbal submissions to the public inquiries held in 2011 concerning the protection of Atlantic salmon (Salmo salar), and clarifications through case law relative to the interpretation of 'likelihood' in the context of screening for likely significant effects as referred to in the Habitats Directive and the Regulations. Accordingly, the sites were re-screened in 2013.

through a Site of Special Scientific Interest (SSSI) was undertaken in a manner which preserved the ecological function of the site and its supported species. He has appeared as an Expert Witness on ecological matters and has significant experience in Habitat Regulations Assessments, including working with Clients, Contractors and Statutory Consultees to design schemes to ensure protection of Natura 2000 sites and their conservation objectives.

1.3.4 Stuart has been assisted by Andy Bascombe, BSC (Hons), MSc, PhD, CEnv, CSci. Andy is a Technical Director at WSP with specific responsibility for ecology, with over 25 years of experience in environmental consultancy. He holds a BSc in Biological Sciences from Leicester University, an MSc in Ecology from UCNW Bangor, and a PhD in Applied Ecology from Middlesex Polytechnic. He is a Chartered Scientist and a Chartered Environmentalist and a full member of both the Chartered Institute of Ecology and Environmental Management and the Chartered Institution of Water and Environmental Management.

1.3.5 Andy has worked on a wide range of projects in the UK and overseas for public and private sector clients, local planning authorities, government departments and other bodies, providing ecological and environmental advice at all stages of developments. He is an experienced project manager who has been responsible for environmental aspects of major developments, and has managed Environmental Statements and Environmental Impact Assessments (EIA) produced for planning applications, undertaken specialist studies including numerous Habitats Regulations Assessments and Appropriate Assessments. He has given expert witness evidence at several Public Inquiries, and has a thorough appreciation of the requirements of all stages of development having worked on projects from conceptual design through to post-construction monitoring.

1.3.6 The assessment was also reviewed and added to by Mabbett Associates (Dr James O'Neill - BSc (Hons) Zoology PhD Ecology and Conservation, Dr Gen Cannibal - BSc Environmental Biology, MSc Environmental Assessment and Management, PhD Environmental Impact Assessment (2nd Consultation Draft) and Beverley Walker – BSc (Hons) Botany Grad Dip Env. Law (UK & EU), (2nd, 3rd Consultation Draft and final report)).

2 The HRA Process

2.1 Objectives

2.1.1 The overall aims of the Habitats and Birds Directives are to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the best examples of them. European and national legislation places a collective obligation on its member states and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation status.

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

2.1.3 Favourable conservation status of a site is achieved when:

- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

2.1.4 The favourable conservation status of a species is achieved when:

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

2.1.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. Accordingly, recognition of the importance of the identified designated sites within the Scheme study area and undertaking habitats assessment appraisals has been ongoing, and has occurred iteratively throughout the development of the A5WTC Scheme, and has

significantly influenced the Scheme design. This iterative design process is outlined in Appendix 2 – Mouchel Report on Re-design of Works near Tully Bog SAC.

2.1.6 In the first instance, the Scheme has aimed to avoid any negative impacts on European sites by identifying possible impacts early in the development of the Scheme, and has avoided sites as much as possible during the corridor and route options appraisal.

2.1.7 Following that, mitigation measures have been applied where necessary, with the aim of ensuring that no significant adverse impacts on the Sites remain.

2.1.8 The purpose of this Report is to provide information on the likely significant effects of the Scheme on the qualifying features of the respective designated sites, identify the mitigation measures proposed, and to assess whether the mitigation measures will ensure that the favourable conservation status of the each of the Sites is maintained.

2.2 Approach to Habitat Regulations Assessment

2.2.1 The gathering and presentation of the information in this document has been informed by the guidance provided in 'Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000)', and European Commission (2001) 'Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Further useful guidance is provided by Section 4, Part 1 of Volume 11 of the DMRB (HD44/09). EU Guidance on Climate Change and Biodiversity (2013) was reviewed. In accordance with the guidance, a staged approach is taken to the assessment of plans and projects under the Habitat Regulations:

Stage 1: Screening/Test of Likely Significance

2.2.2 This is where it is established if an appropriate assessment is required and is referred to as 'screening'. Its purpose is to identify the likely impacts upon a Natura 2000 Site of a project or a plan, either alone or in combination with other plans or projects and considers whether these impacts are likely to be significant. It will include:

- A description of the project;
- Identification of relevant Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from implementation of the project;
- Assessment of the significance of the impacts identified above on site integrity; and
- Exclusion of sites where it can be objectively concluded that there will be no significant effects.

Stage 2: Appropriate Assessment (AA)

2.2.3 Should Stage 1 determine that there is a 'likelihood' of an effect on the qualifying features of a site, or that any significant effects cannot be ruled out, then the assessment proceeds to Stage 2. This stage considers the potential impacts on the structure and function (**integrity**), as well as the **conservation objectives** of the Natura 2000 Sites that the Proposal may have either alone or in combination with other projects or plans. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is presented. This stage includes:

- A description of the Natura 2000 sites that will be considered further in the AA;
- A description of the likely impacts on the conservation objectives of the site, and an assessment of their significance;
- Mitigation Measures; and
- Conclusions.

2.2.4 If it cannot be ruled out that no significant adverse effects will occur on a site's conservation objectives, then the assessment proceeds to Stages 3 and 4.

Stage 3: Assessment of alternative solutions

2.2.5 This process examines alternative ways of achieving the objectives of the Proposal that avoid adverse impacts on the integrity of the Natura 2000 sites.

Stage 4: Imperative reasons of overriding public interest

2.2.6 This stage is the main reason of exemption from Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI), and where no alternative solutions exist, for allowing a plan or project which will have adverse effects on the integrity of a Natura 2000 site to proceed.

2.2.7 This Report addresses Stage 1 and Stage 2 of the HRA Process.

2.2.8 For the purposes of this assessment, the term 'likely' is applied within the proper meaning of the term as defined in the corpus of EU environmental law. In that sense, a 'likely' significant effect is deemed herein to be not one which is more likely than not to occur, but rather one with a genuine possibility of occurrence, no matter how small that likelihood may be. That being so, the precautionary principle required in HRA is integrated into the very heart of the assessment methodology and the assessment is thus as robust as possible.

2.2.9 The definition for 'integrity' adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - *Biodiversity and Geological conservation – Statutory obligations*

and their impact within the planning system, which defines integrity in the context of designated sites as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

2.2.10 The test of 'significance' is where a plan or project could undermine the site's conservation objectives. The assessment of that risk (of 'significance') must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.

3 Stage 1 – Screening

3.1.1 As discussed above, the first stage of an HRA assessment is to consider whether a project could cause 'likely significant effect' on the qualifying features of the Natura 2000 site(s), alone or in-combination with other plans/projects. In line with EU Guidance, and the DMRB method of assessment screening matrices have been completed for each of the potentially affected Natura 2000 sites. Table 3.1 provides this information.

Table 3.1 (Stage 1) Screening Matrix for Tully Bog SAC

Table 3.1 – DMRB Screening Matrix for Tully Bog SAC		
Project Name:	**A5 WTC**	
Natura 2000 Site under Consideration:	**Tully Bog SAC**	
Date:	**Author (Name/Organisation):**	**Verified (Name/Organisation):**
05/08/2014	S.Ireland, Mouchel (now WSP)	P. Reid, Mouchel (now WSP)
Description of Project The proposed 85km A5 Western Transport Corridor (A5 WTC) scheme forms part of a strategically important transport route between Londonderry/Derry in Northern Ireland (NI) and to Dublin in the Republic of Ireland (ROI). The proposed scheme involves replacement of the existing A5 from a point north of New Buildings Londonderry in the north to a point south of Aughnacloy in the south with a dual carriageway along an alignment off-line from the existing road. In NI the existing road passes through New Buildings, Strabane, Sion Mills, Newtownstewart, Omagh and Aughnacloy. The proposed scheme will be close to the designated site in a number of other locations. It is anticipated the proposed scheme will be built in three phases starting with Phase 1 to commence in 2017, Phase 2 in 2022 and Phase 3 in 2026. It is anticipated that each phase will take some 2 to 3 years to construct.		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and scale *(road type and probable traffic volume)*	The project involves the construction of an 85 km long dual carriageway, with associated drainage and local road improvements. Traffic volumes are anticipated to be a maximum of 10000 AADT (Average Annual Daily Traffic) in the vicinity of Tully Bog (to the nearest 100) within 15 years of the road opening. This may impact on air quality and thus on features of the SAC.	
Land-take	No works are proposed to take place within the SAC.	
Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The main carriageway is 205m from the SAC boundary, with slip roads 125m from the boundary.	

Table 3.1 – DMRB Screening Matrix for Tully Bog SAC	
Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None
Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	1. Nitrogen Deposition – the scheme could lead to higher levels of Nitrogen being deposited from traffic emissions. 2. Construction Dust – as standard construction mitigation measures are very successful at controlling dust, it is unlikely that construction dust would impact on the site.
Excavation requirements *(e.g. impacts of local hydrogeology)*	Although part of the route will be in cutting nearby, no drainage features associated with the bog will be affected. Emerging research indicates that raised bogs may be groundwater dependant, thus alteration in local hydrology could impact on the site.
Transportation requirements	Construction related traffic and operational use of the scheme may result in potential depositional impacts upon bog features comprising qualifying features of the SAC.
Duration of construction, operation, etc	It is anticipated that construction of Phase 2 will last for approximately three years. Phases 1 and 3 are located outside of the zone of influence for Tully Bog such that their construction will have no implications for the SAC.
Other	None
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
Nature of proposals	Best practice working procedures will be implemented during construction such as damping down of dust which will reduce airborne matter from contaminating the site during construction. Pollution Prevention Guidelines (PPGs) will be followed during construction to avoid adverse impacts on local water quality.
Location	All works within 500m of the SAC
Evidence for effectiveness	Legally required and widely accepted best practice
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Legal conditions of national legislation & best practice guidance through NIEA PPGs. Contractual obligations placed on the contractor by DfI and monitored by DfI's appointed Environmental Representatives.

Table 3.1 – DMRB Screening Matrix for Tully Bog SAC	
Characteristics of European Site(s) *A brief description of the European Site should be produced, including information on:*	
Name of European Site and its EU code	Tully Bog SAC UK0030326
Location and distance of the European Site from the proposed works	Tully Bog SAC is located at NI OS Grid Reference H419754 and its boundary is 205m from the proposed carriageway and 125m from the slip roads for a junction.
European Site size	The SAC covers 35.99Ha[7]
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The site consists of a raised bog displaying typical bog vegetation surrounded by former cuttings supporting birch woodland. Its primary reason for selection is the 'active raised bog' habitat. No other reasons or qualifying features are given.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The major threats to the site are drying of the surface through excessive drainage and increased nutrient levels through airborne pollutants. Either of these have the potential to damage the quality of the bog vegetation.
European Site conservation objectives – where these are readily available	1. Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation. 2. Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species. 3. Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog. 4. Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog. 5. Maintain the hydrology of the raised bog peat mass. 6. Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation.

[7] Based on 2009 JNCC Natura 2000 data sheet. The 2015 JNCC Natura 2000 data sheet quotes the site as 36.06ha. This figure has been carried throughout the remainder of the document.

Table 3.1 – DMRB Screening Matrix for Tully Bog SAC	
Assessment Criteria *Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.*	
Degradation of Annex 1 habitat through airborne pollutants Airborne pollutants in the form of particulate matter and nitrogen compounds could lead to deterioration of the raised bog habitat. Therefore the potential impacts of airborne pollutants cannot be ruled out without further investigation. Degradation of Annex 1 habitat through changes to hydrological regime Alteration to local hydrology through excavations or surcharging could reduce the availability of water to the site, leading to a degradation of the raised bog habitat. Therefore, the potential impacts of hydrological change cannot be ruled out without further investigation.	
Initial Assessment *The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.* *Describe any likely changes to the site arising as a result of:*	
Reduction of habitat area	No direct loss of qualifying habitat anticipated. However, impacts from airborne pollutants or local hydrology could result in a reduction in habitat area if unmitigated.
Disturbance to key species	N/A
Habitat or species fragmentation	There will not be any fragmentation of habitats within the SAC.
Reduction in species density	Density of species associated with a healthy raised bog surface may be reduced if airborne pollutant deposition is shown to be increased beyond levels anticipated without the proposed scheme. Alteration in local hydrology could reduce species density within the bog plant community.
Changes in key indicators of conservation value (water quality, etc)	Air quality changes could lead to changes in the key indicator species of the bog. Hydrological changes could lead to changes in the key indicator species of the bog.
Climate change	The scheme has the potential to contribute to the problem of climate change by increasing the carrying capacity of the current road network. Changes in rainfall patterns due to climate change could have direct impacts on the integrity of the site.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	None.

Table 3.1 – DMRB Screening Matrix for Tully Bog SAC	
Interference with key relationships that define the function of the site	None.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	There could be significant effects subject to mitigation.
Disturbance to key species	N/A
Habitat or species fragmentation	No significant effect predicted.
Loss	None
Fragmentation	None
Disruption	None
Disturbance	None
Change to key elements of the site *(e.g. water quality, hydrological regime etc)*	There could be significant effects subject to mitigation.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known. An assessment of the potential effects on air quality including climate change would necessitate detailed studies of anticipated traffic flow during and after construction. However air quality modelling has identified that increases of NO_x and deposits of particulate matter are not anticipated on Tully Bog with increases only expected within the immediate vicinity of the proposed works (Mouchel 2010).	
Outcome of screening stage (delete as appropriate).	Significant Effect Possible on Qualifying Habitats. Assessment progressed to Stage 2.
Are the appropriate statutory environmental bodies in agreement with this conclusion? (Delete and attach appropriate communication).	**YES** See Appendix 7

3.1.2 Based on the EU guidance, and using the templates provided in Annex 4 of the HD 44/09 guidance to record the findings of the screening process sequentially and transparently in this report, it has been concluded for Tully Bog SAC:

- that the proposed Scheme is a project which is not connected with or necessary to the management of the SAC;
- the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
- that Stage 2 Appropriate Assessments should accordingly be undertaken.

4 Stage 2 – Appropriate Assessment

4.1 Introduction

4.1.1 As described above, this stage considers the potential impacts on the structure, function, and conservation objectives of the Natura 2000 Site. Where there is the potential for adverse impacts, an assessment of the potential mitigation of those impacts is presented. The assessment should consider the impacts the Proposal may have either alone or in combination with other projects or plans. This stage includes:

- A description of the Natura 2000 site that will be considered in the AA;
- A description of significant impacts on the conservation feature of the site likely to occur from the Plan;
- Mitigation Measures; and
- Conclusions.

4.2 Scope of the information to inform the appropriate assessment.

4.2.1 The scope for the studies and assessments which form the focus of the information provided in this report has been established in light of the findings of the screenings for the designated site. Likely impacts identified relate to:

- degradation of the qualifying habitat as a result of airborne pollutants; and
- degradation of the qualifying habitat as a result of changes to the hydrological regime.

Degradation of the qualifying habitat by airborne pollutants

Data Sources

4.2.2 The following data sources have been relied on:

- data provided in the 2010 and 2016 ES;
- data derived from site surveys undertaken in 2014 by the Mouchel (now WSP) assessment team;
- data derived from the Air Pollution Information System website (APIS)[8]; and
- data derived from air quality modelling undertaken in 2015 and 2017.

[8] www.apis.ac.uk

Impact assessment

4.2.3 The data derived from the data sources has been reviewed to establish the potential for airborne pollutants to enter the SAC. Potential pollutants which may have a deleterious effect on the SAC are oxides of nitrogen and nitrogen deposition.

4.2.4 The information has then been evaluated to determine the nature of the potential impacts on the habitat as a result of the construction and future use of the proposed scheme. Assessments are made against the EU air quality limit of values for vegetation, 30 µg/m^3, and the United Nations Economic Commission for Europe (UNECE) critical load for raised bog of 5-10 kg N/ha/y

4.2.5 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures subject to the findings relating to effects on integrity of the site.

Degradation of the qualifying habitat through changes to the hydrological regime.

Data Sources

4.2.6 The following data sources have been relied on:

- data provided in the A5WTC ES 2010 and 2016;
- data derived from site surveys undertaken in 2014 by the Mouchel (now WSP) assessment team;
- data derived from hydrology and drainage assessments undertaken in 2014; and
- DOENI Tully Bog SAC Conservation Objectives Monitoring Summary (as updated 01/04/15)[9].

Impact assessment

4.2.7 The data derived from the data sources has been reviewed to establish the potential for alterations to the hydrological regime of the SAC as a result of the construction and location of the proposed scheme.

4.2.8 The information has then been evaluated to determine the nature of the potential impacts on the habitat as a result of the construction and future use of the proposed scheme.

[9]https://www.daera-ni.gov.uk/sites/default/files/publications/doe/land-information-tully-bog-conservation-objectives-2015.pdf

4.2.9 Where the assessment has indicated such impacts would be likely to occur, consideration has then been given to appropriate mitigation measures subject to the findings relating to effects on integrity of the site.

Implications of Climate Change

4.2.10 Long term climate change predictions (to 2080)[10] indicate that natural winter precipitation is predicted to increase, with more frequent extreme winter events. By contrast, summer temperatures will increase and precipitation is likely to decrease. The implications of these changes to Tully Bog are discussed further below.

4.3 Determination of adverse impact relative to integrity

4.3.1 Once potential impacts have been identified, they are considered in relation to the potential to have a negative effect on the integrity of the Natura 2000 site to be evaluated. This assessment determines whether there is likely to be:

- a reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and
- whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it has been classified.

[10] The project assessment parameters have been based on UK climate change predictions from 2009 (UKCP09). Accordingly, the validity of these forecasts has been reviewed as part of this HRA exercise, using the latest guidance from UKCP09, prior to its proposed update in 2018.

The guidance (*Is UKCP09 still an appropriate tool for adaptation planning? April 2016*) concludes that UKCP09 continues to provide a valid assessment of future climate change over land. In particular it demonstrates that UKCP09 is competitive with results from the most recent assessment by the International Panel on Climate Change (IPCC), (CIMP5), such that:

- Future changes in summer and winter temperatures are consistent between CIMP5 and UKCP09 projections;
- Future winter rainfall changes are consistent between both models.
- Both CIMP5 and UKCP09 projections agree that long term average of summer rainfall are more likely to reduce than increase, however CIMP5 predicts a larger chance of an increase in summer rainfall, and less risk of a substantial reduction than UKCP09. This is attributable to the use of different data sets.
- Notwithstanding, the guidance states that users should still continue to regard the full range of UKCP09 results as plausible outcomes for summer rainfall, to consider planning decisions.

The review has concluded that the most up to date projected changes to the baseline environment with regard to precipitation and surface flows in streams as a consequence of climate change, remain the same as those used in the EIA and previous HRA reports. For summer precipitation and river flows, UKCP09 represents a worse-case scenario and under the precautionary principal, has been appropriately adopted as the working assumptions for the Scheme and in this HRA.

4.3.2 The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of a site. The completed checklist for Tully Bog SAC is provided in Appendix 4.

5 Description of the proposed scheme

5.1 Alignment and relationship with Tully Bog

5.1.1 The proposed scheme comprises an 85km dual carriageway running between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. Its location and relationship to Tully Bog is shown in Appendix 1 - Figure 1.

5.1.2 The section of the proposed scheme which is of relevance to Tully Bog SAC is that between Lisnagirr Road and the Fairy Water. In this location the principal components of the proposed scheme comprise the dual carriageway and junction 11, a full grade-separated junction which caters for access onto and exit from the strategic road north of Omagh, The proposed dual carriageway is located approximately 230 - 600m east of the designated site. North bound on and off slip roads, a western roundabout forming part of a central dumbbell arrangement at the junction and a link road between the roundabout and Drumlegagh Road South are located between the dual carriageway and the eastern boundary of the designated site. The junction of the link road and Drumlegagh Road is approximately 125m east of the designated site. There will also be a working corridor extending approximately 25m beyond the road footprint.

5.1.3 In the vicinity of the SAC the road will be elevated on a shallow embankment for approximately 400m and pass through a shallow cutting for a further 200m. A larger embankment will be required for the side road/interchange at junction 11 approximately 200m from the site. The route passes through a deeper cutting approximately 450m to the north-east of the SAC.

5.1.4 The key design aspects of the proposed scheme comprise the carriageway and associated earthworks, junctions, side roads, structures, drainage, lighting, landscape proposals, compensatory flood storage, deposition areas and environmental mitigation measures. The proposed scheme design has been completed with reference to the DMRB, including Volume 10 of that publication for the protection nature conservation and biodiversity features.

5.1.5 Table 5.1 provides traffic flows in the vicinity of Tully Bog SAC for the Base Year (2013) and opening year (2028). The Average Annual Daily Traffic (AADT) and the number of HGVs within that total are provided. Note that whilst 2028 is the opening year for the whole scheme, this phase (Phase 2) of the scheme which passes Tully Bog is programmed to be open to traffic earlier than this (in 2023) and modelling has also been carried out for that year, as detailed in Section 7.

Table 5.1 Traffic flows passing Tully Bog SAC for base year and opening year (whole scheme)

Existing A5 Adjacent to Tully Bog Base Year		
	AADT	**HGVs**
North Bound	6070	783
South Bound	5989	731
Existing A5 Adjacent to Tully Bog Opening Year		
	AADT	**HGVs**
North Bound (North of J11)	3203	211
South Bound (North of J11)	3211	193
North Bound (South of J11)	4571	357
South Bound (South of J11)	5317	436
Through J11 Opening Year		
	AADT	**HGVs**
North Bound	5074	685
South Bound	4694	573
J11 Slip Roads Opening Year		
	AADT	**HGVs**
North Bound Offslip	1385	118
North Bound Onslip	2291	222
South Bound Offslip	2782	225
South Bound Onslip	1361	90
Drumlegagh Road South within 500m of J11 Opening Year		
	AADT	**HGVs**
Base Year East Bound	612	97
Base Year West Bound	461	38
Opening Year East Bound	655	107
Opening Year West Bound	532	41

6 Tully Bog SAC

6.1 Introduction

6.1.1 The designated site, is located within an area of agricultural land, between two local roads, Drumlegagh Road South and Todds Road some 180m north of the Fairy Water in the river's former flood plain and approximately 400m west of the existing A5 at NI OS Grid Reference H419754

6.1.2 Tully Bog was first recognised as an Area of Special Scientific Interest (ASSI) in 1996 because of its physiographical features and peatland flora and associated fauna. Biological interest relates to the size and intactness of the bog, in addition to the diversity of the vegetation and structural features, and the presence of rare and notable species. The central intact dome is fairly well developed and supports a weak temporary pool system with a good hummock and hollow development on the bog plain. The bog vegetation is characterised by a high cover of Sphagnum mosses, ericoid dwarf shrubs and other associated species. Along the top of the dome to the north-east of the intact surface, a deep narrow, sinuous water-filled crack has developed in the peat surface, which may be the result of marginal cutting. Within the deep peat surrounding the fissure, small pools are scattered throughout the lawn and hummock complex

6.1.3 Disturbance to the bog had been confined to cutting and occasional burning on both the intact core and cutover margins. The effects of old and more recent peat cutting have likely resulted in some drainage of the raised bog, and the development of birch woodland on former peat cuttings. Towards the southern end of the bog, a small drumlin lies close to the surface of the peat, which is, as a result, more freely-draining. Some of the peripheral cut over bog is permanently waterlogged, although the vegetation in this peripheral area suggests that some regeneration was occurring at the time.

6.1.4 The Natura 2000 data form obtained from the Joint Nature Conservancy Committee (JNCC, 2015) website is provided in Appendix 3. The data form notes the site covers an area of 36.06 ha and is designated for active raised bog (23.8ha – Grade B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.) and degraded raised bog still capable of natural regeneration 10.85 ha Grade D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature. Both are priority habitats under Annex 1 of the Directive. The 2014 condition assessment[11] further confirms the findings of the 2008 assessment in that the bog surface is drying out.

6.1.5 The designated site has been subject to detailed surveys by WSP following National Vegetation Classification (NVC) (Rodwell 1991) methodology and separate bryophyte

[11] See footnote 10.

surveys, all surveys were undertaken during 2009 and then between April and August 2014. The results of the NVC surveys are illustrated in Appendix 1 - Figure 3.

6.1.6 The surveys confirmed the presence of raised bog, birch woodland and marshy grassland communities. The communities found were assessed for their similarity to known NVC communities.

6.2 NVC Survey Results for the Raised Bog Habitat

6.2.1 Tully Bog possesses sections within the bog surface which exhibit slightly different floristic characteristics; with the southern section of the bog appearing drier and having less extensive Sphagnum coverage than the central and uncut northern sections. The drier southern section identified as M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire-*Erica tetralix* sub-community to the south east of the site in 2009 is now subsumed under the broader sampling compartment previously identified as M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire in 2009. These two previously separate sampling compartments are now considered to be homogenous in appearance and species composition.

6.2.2 The highest similarity co-efficient (58.7 %) for the central section is for M18a *Erica tetralix-Sphagnum papillosum* raised and blanket mire-*Sphagnum magellanicum-Andromeda polifolia* sub-community. The second highest match (57.8 %) is for M17a *Scirpus cespitosus – Eriophorum vaginatum* blanket mire *Drosera rotundifolia – Sphagnum* spp. sub-community. Small changes in sub-community type are common when undertaking quadrat sampling across extended periods.

6.2.3 The central and northern section assigned as simply M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire in 2009 is now assigned M18a *Erica tetralix-Sphagnum papillosum* raised and blanket mire-*Sphagnum magellanicum-Andromeda polifolia* sub-community.

6.2.4 As in the 2009 study *Sphagnum magellanicum* was found to be absent from the quadrats sampled from the raised bog, although this species is present at Tully Bog, but in far smaller amounts than at McKean's Moss. Other Sphagnum species are constants throughout this area including *S. papillosum, S. subnitens, S. tenellum* and *S. capillifolium*. The citation for the SAC states that the notable Sphagnum species *S. fuscum* and *S. imbricatum* (now separated into two taxa-*S. affine* and *S. austinii*) are known to occur on the bog. Four hummocks of *S. fuscum* and two hummocks of *S. austinii* were recorded in 2009. *Sphagnum fuscum* was still found to be present around the same area of the bog surface as in 2009 (towards the eastern edge of bog, to the north of the power lines which cross near the centre of the bog).

6.2.5 Another notable species *Sphagnum austinii* was also found around the same location as *S. fuscum*. This species was not found in 2009 but was known to have been recorded at Tully Bog as it is listed (as *S. imbricatum*) in the SAC and ASSI declarations. This species was also recorded as an incidental by P. Hanson on 24/06/10. Both of these species are indicators of areas of undamaged bog habitat and are often found in association. They have not been found on any other areas of Tully Bog.

6.2.6 The wetter northern section of the bog is closest to M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire-*Erica tetralix* sub-community. This sub-community develops a greater abundance of Sphagnum species than other M19 comunities and shows a number of floristic features transitional to M18 mires, with *S. capillifolium* being quite commonly accompanied by *S. papillosum* and sometimes by *S. tenellum* as is the case at Tully Bog. Overall though the Sphagnum coverage is not so rich or dense as in M18 mires. A small cut area to the south of the car park also most closely matches M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire-*Erica tetralix* sub-community.

6.3 NVC Survey Results for the Birch Woodland Habitat

6.3.1 The lagg surrounding the bog has been cut for peat. The oldest cuttings at the outer edge of the area are dominated by downy birch woodland, with smaller amounts of Scots pine *Pinus sylvestris*. A small area of birch woodland has also developed to the south of the central area of the bog. The woodland is referable to the W4 *Betula pubescens-Molinia caerulea* woodland-community. This is a minor change from the 2009 NVC survey which classified the woodland as W4a *Betula pubescens-Molinia caerulea* woodland- *Dryopteris dilatata-Rubus fruticosus* sub-community. This difference is likely to be explained by the sampling quadrat locations during the two surveys differing.

6.4 NVC Survey Results for the Marshy Grassland Habitat

6.4.1 This vegetation type is not mapped in Appendix 1 - Figure 3 due to the small size of the sample area and the difficulty of matching the results to an NVC community. The MATCH program gives M27c *Filipendula ulmaria-Angelica sylvestris-Juncus effusus-Holcus lanatus* sub-community as the most appropriate community type but the only M27 constant species *Filipendula ulmaria* was absent from all quadrat samples.

6.4.2 In the north western corner of the SAC is an area of fly-tipping and hard standing which is noted on the NVC map (Appendix 1 – Figure 3) as unclassified habitat.

6.5 Hydrology of the Bog

6.5.1 As with the majority of active raised bogs, the depth of the peat isolates the bog from the influence of groundwater; the raised dome of peat, which lies >70 mAOD (metres above Ordnance Datum), is therefore irrigated solely by precipitation (Lindsay 1995).

6.5.2 There are two main water discharge points from the bog, one at the north western edge, the other at the south eastern tip of the site (Appendix 1 - Figure 4). As stated above, the effects of old and more recent peat cutting have resulted in some drainage of the raised bog itself, and the bog surface continues to dry out. However net discharge from the site is likely to be quite low due to the absorption effect of the woodland buffer that forms the perimeter of the bog. The discharge point at the northwest of the site flows in a north westerly direction (channel width <1m) before converging with Tully Drain (channel width <1m). Tully Drain then flows in a southerly direction, beneath Todds Road, which runs along the western edge of the bog via a culvert, and on into the Fairy Water approximately 350m further south. Upstream of Tully Bog, Tully Drain also receives waters from a significant area of agricultural farmland.

6.5.3 The second main discharge point, at the south eastern tip of the site, drains water from two channels which converge and flow south via an unnamed drainage ditch, beneath Todds Road and into the Fairy Water approximately 180m south of the peat bog.

6.5.4 In general, the site slopes towards the eastern edge of the bog, consequently, the centre of the bog drains in an easterly direction via a network of drainage channels, all eventually flowing into Tully Drain. Tully Drain flows parallel to the eastern edge of the site in a south east direction before flowing beneath the existing A5 and into the Strule River to the north of Straughroy.

6.5.5 There is a significant area of water storage at the north western corner of the site where a pond has developed.

6.6 Surrounding Geology

6.6.1 In the wider context of the former flood-plain of the Fairy Water the geology consists of a combination of alluvium, glaciofluvial sands and gravels within the Mourne and Strule Valleys. Localised areas of glacial tills of low permeability and areas of peat are found between Mountjoy and Omagh. The site is located on peat with areas of clay and alluvial deposits to the east under the proposed scheme footprint (Mouchel 2010a).

6.7 Surrounding Land Use

6.7.1 The land surrounding the site is intensively managed agricultural land in silage and grazing, categorised as improved grassland or arable habitats in the Phase 1 surveys. The aerial photography for the surrounding land is displayed on Figure 4 in Appendix 1 to this report. Tully Bog is isolated from other expanses of bog by these land uses. One small area of birch woodland and modified bog is located just over 500m to the north east, with another 1.3km to the north. Several other small areas of modified bog are located approximately 450m to the south of the SAC, but these are separated from the site by the Fairy Water. The closest areas of extensive bog habitat are those within the Fairy Water Bogs SAC approximately 8km to the west. The only other semi-natural habitats in the vicinity of the site are the woodlands of Mountjoy Forest approximately 1km to the east and isolated patches of woodland along the banks of the Fairy Water.

6.7.2 In 2016, an access laneway, for use when the primary access to the property and agricultural holding was flooded, was approved and constructed in the northern woodland fringe of the SAC. The Local Planning Authority (as Competent Authority for this application) determined that the proposal would have no significant effect on the integrity of the SAC.

6.8 Vulnerability

6.8.1 The main threats, pressures and activities with impacts on the site have been extracted from the most recent Conservation Objective Form (April 2015) and listed in 6.8.2 to 6.8.10 as follows:

Peat Cutting

6.8.2 There has been extensive hand cutting for many years around the periphery. Along the edge of the intact bog, the cut peat face is high in places, resulting in localised desiccation of the adjacent intact surface. Although the old hand cuttings now support either actively regenerating bog vegetation or birch wood, localised mechanised peat cutting has been carried out within the former in recent years at the northern end of the site. In one instance, mechanised cutting had encroached onto the intact surface of the bog. Peat cutting at the time of designation was not seen as problematical.

Burning

6.8.3 Burning of the vegetation has taken place occasionally. NIEA surveys reported some evidence of burning over most of the northern half; in a limited area the effect was described as severe. However, the most recent NIEA habitat survey concluded that the bog had recovered well. Excessive burning will tend to reduce the cover of Sphagnum mosses and ericaceous species, increasing the proportion of *Molinia caerulea* and *Trichophorum cespitosum*. In addition, structural diversity will be reduced as many of the rarer and more prominent hummock-forming species (such as *S. imbricatum*) appear to be particularly susceptible to burning.

Drainage

6.8.4 The intact surface remains largely free of drains. However, there are a few old drains associated with the cuttings around the periphery. Any drains that are currently carrying water away from the peat mass should be identified and blocked. Note that drainage works outside of the site's boundaries could potentially impact on the bog's hydrology.

Grazing

6.8.5 Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.

Nitrogen Deposition

6.8.6 Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Tully Bog SAC.

Scrub Encroachment

6.8.7 Trees and scrub growth is extensive within the cutover bog extending right up to the periphery of the intact area in parts. In addition a localised stand of trees and shrubs is growing in the centre of the intact area due to the presence of mineral soil close to the surface here. Scattered birch scrub is extending out from this isolated stand onto the intact surface to the east. Scrub encroachment into the actively regenerating cutover areas, or onto the intact surface is undesirable and generally indicates drying out. Even where this is not the case, scrub can

damage the bog vegetation through such factors as shading and leaf litter. In addition, tree roots may disrupt the hydrological function of the underlying acrotelm[12] and catotelm[13], and act as nitrogen fixers (e.g. Birch), thus altering the chemical composition of the peat.

Fly-tipping

6.8.8 There have been a few localised incidents of fly-tipping in the cutover area of the bog. A more serious problem occurs to the north of the bog where extensive infilling over a small area was carried out prior to designation. This infilling consists of hard-core infill which has now risen well above the surface of the bog. The dump was included within the site to prohibit further expansion. It has now been consented as a storage area as part of a Management Agreement.

Changes to surrounding land use

6.8.9 Any changes in local land-use e.g. drainage, road improvements, afforestation, agricultural intensification and development, may be detrimental to the SAC.

Climate Change

6.8.10 Northern Ireland faces changes to its climate over the next century. Indications are of hotter, drier summers, warmer winters and more frequent extreme weather events.

6.9 Conservation Objectives

6.9.1 The conservation objective for the site is:

'To maintain (or restore where appropriate) the active raised bog to favourable condition.'

6.9.2 NIEA have set a number of Component Objectives which seek to attain the conservation objective for the active raised bog. These are described in Table 6.1.

[12] The upper layer of the bog which contains the living Sphagnum mosses, the peat forming community

[13] The lower layer of the bog which comprises peat containing dead plant material

Table 6.1 Component Objectives taken from the NIEA Conservation Objective Form (April 2015)

Component Objectives taken from the NIEA Conservation Objective Form	
Feature	**Component Objective**
Active raised bog	Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation.
	Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species.
	Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog.
	Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog.
	Maintain the hydrology of the raised bog peat mass.
	Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation.

6.9.3 NIEA state that the first condition assessment of the site was carried out in November 2002. Their provisional evaluation of the results suggests that the active raised bog is in unfavourable condition. The condition assessment undertaken by NIEA in 2008, and again in 2014 suggests that the active raised bog is in unfavourable: declining condition due to an increase in signs of drying out. There is no management plan currently in place for the Bog.

6.9.4 The most recent review of the Conservation Objectives, effective from April 2015, is included in Appendix 5.

7 Potential impacts and mitigation

7.1 Identified threats

7.1.1 The key threats identified for Tully Bog SAC are:

- Biocenotic evolution, succession
- Human induced changes in hydraulic conditions
- Air pollution, air-borne pollutants (particularly Nitrogen)
- Fire and Fire Suppression

7.1.2 These are each considered below with regard to the potential impacts of the A5WTC Scheme

7.2 K02 Biocenotic evolution, succession

7.2.1 In its natural state, a raised bog is comprised of a group of interacting organisms that live in a particular habitat and form a self-regulating ecological community (biocenotic), with succession being the process of change in the species structure of an ecological community over time.

7.2.2 At Tully Bog, there is threat of an accelerated change of species which would not occur normally, as a consequence of the main threats identified above.

7.3 Degradation of the qualifying habitat through changes in hydraulic conditions.

7.3.1 The hydrological regime of Tully Bog SAC and of raised bogs in general as ombrotrophic[14] mires, consists of input primarily through precipitation with output through streams (lags) around their periphery.

7.3.2 In its natural state a bog is 95% to 98% water. Drainage removes water and increases the dry matter content of the peat. This causes shrinkage of the peat causing the bog to sink. Studies undertaken by the Republic of Ireland National Parks and Wildlife Service at Clara Bog, Co. Offaly have shown that the bog has subsided by as much as 5 to 6m depth alongside a main drain and the effects of subsidence are in evidence at a distance of 500m from the drain itself. Cracking of the peat is commonly associated with subsidence. Subsidence of the peat and cracking increases the slope of the bog surface and this increases the discharge of water.

7.3.3 Drainage removes water from the peat lowering the water table. Studies at Wedholme Flow in the UK by English Nature (Labaz & Butcher, 2004) showed that each drain inserted, had the effect of lowering the water table over the entire site from 10cm to 30cm or more. This destroys the acrotelm, the upper layer of the bog which contains the living Sphagnum mosses, the peat forming community. As a result the bog loses its peat forming capacity. The vegetation changes from a Sphagnum dominated community to a vegetation type dominated by dry bog species such as heathers, and sometimes colonisation by birch trees follows. Once peat is

[14] Dependent on atmospheric moisture for water and nutrients

exposed to air by drainage, it begins to break down. Oxygen in the air makes it possible for bacteria to digest the peat. Carbon is released during decomposition. Drying of the peat and decomposition changes it structurally, making it difficult to re-wet and therefore unsuitable for re colonisation with Sphagnum mosses.

7.3.4 Drainage also causes bog pools to dry up with the result that the associated plant and animal communities also disappear. The dry conditions in the bog caused by drainage also make it more susceptible to fire damage.

Potential Effects of the A5WTC

7.3.5 Construction of the road scheme could exacerbate the existing impacts on the hydrology of the raised bog if it causes an increase in drainage at or beneath the bog surface.

7.3.6 The bog occupies the lowest point in the local terrain. The nearest proposed works are the tie-ins to Todds Road and Drumlegagh Road. They do not involve any work to the west side of Drumlegagh Road. The main line works involve a range of low height embankments and cuttings. The cuttings will not extend below the level of the bog, so would not depress the local groundwater level.

7.3.7 There are areas of soft ground between Junction 11 and Drumlegagh Road, approximately 100m or greater from the designated boundary, which will need to be removed and replaced with sound material during the construction of the earthworks. However, that excavation is not expected to be more than 2m deep and therefore not significantly below the level of the Tully Bog. The embankments will result in a surcharging of the ground around junction 11, which will result in a minor reduction in the permeability of the clay soils in that area. That may result in a minor and local increase in the groundwater level up-gradient of that location. Given the distance and temporary nature of those works, the impact upon the groundwater regime is expected to be negligible.

7.3.8 The construction of the proposed scheme is not expected to affect the hydrological regime either by decreasing the input or increasing the output of water. No drainage features of the bog will be affected as a result of the proposed scheme.

7.3.9 Therefore, the proposed scheme will not have an adverse effect on the hydrology of the bog.

7.4 Degradation of the qualifying habitats by airborne pollutants

Nitrogen deposition

7.4.1 Tully Bog has been identified as being potentially sensitive to nitrogen deposition (nitrogen saturation of sphagnum) which could have an effect on the species composition of the bog habitat.

7.4.2 Nitrogen is an element which is used in plant growth, and in excessive quantities promotes increase in vascular plant growth, altered growth and species composition of bryophytes; and increased nitrogen in peat and peat water which can alter the habitat composition of a bog.

This can lead to the habitat altering in a manner which reduces the biodiversity value of the site.

7.4.3 The current levels of Nitrogen deposition for Tully Bog are taken from APIS. These are mapped on a 5km x 5km basis with the area covered by each 5km grid square noted. The data currently available on the system are for 2013-2015.

7.4.4 The APIS site states average levels at Tully Bog for 2013-2015 as 4.9 µg NO_x /m^3(as NO_2) and 20.44 to 23.66 kg N/ha/y (average 21.13 kg N/ha/y/). Therefore current levels are below the EU air quality limit of values for vegetation, 30µg NO_x/m^3, but above the United Nations Economic Commission for Europe (UNECE) critical load for raised bog of 5-10 kg/N/ha/y.

7.4.5 The UK has some of the highest levels of N deposition in Europe. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Payne (2014) reports that over across all habitats in the UK, N deposition exceeds the lower limit of the critical load range in 69.6 % of studies areas; and across all bog communities (NVC M1:M3, M18:M21), 97% of sites exceed the lower limit of the critical load

7.4.6 The main sources of N deposition at Tully Bog are assumed to be from long term historic agriculture and intensive livestock agricultural land uses, including transboundary depositions, with some contributions from existing roads.

Potential Effects of the A5WTC

7.4.7 The DMRB (HA207/07) describes how air quality impacts should be screened. It states that only "affected roads" within 200m of a designated site need to be considered, and affected roads are described as meeting any of the following criteria:

- road alignment will change by 5m or more; or
- daily traffic flows will change by 1,000 AADT (annual average daily traffic) or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- daily average speed will change by 10 km/hr or more; or
- peak hour speed will change by 20 km/hr or more.

7.4.8 The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205m, however changes to the side road network are within the 200m zone. Therefore air quality modelling of the effects of the proposed scheme has been undertaken using the software 'ADMS-Roads'.

7.4.9 Earlier consultation drafts calculated deposition rates along a single transect as shown in Figure 5 which were interpreted across the remainder of the Bog. More intensive modelling undertaken in 2017 (as reported in the 3rd Consultation Draft) presents a more representative understanding of the effect distance has on the rate of deposition as is indicated in Appendix 1 - Figure 6 and discussed below.

7.4.10 To determine the potential for the scheme to have any additional impact on the qualifying habitats, two scenarios were investigated for the scheme Opening Year: the Do Minimum (DM) scenario, which assumes the scheme has not progressed but that the existing road network has been subject to general maintenance, and that traffic has grown in line with national predictions; and the Do Something (DS) scenario which assumes the scheme has been completed, and that traffic growth and patterns are in line with the national predictions and the traffic modelling undertaken for the Scheme. The DS scenario includes the expected transfer of traffic from the exiting A5 to the A5WTC.

7.4.11 Nitrogen (N) deposition rates at the site were predicted for both scenarios. Predicted annual mean NO_X concentrations were compared to the national and European air quality limit values for vegetation, particularly the critical loads for Nitrogen set by the UNECE for the habitat type forming the focus of the designation, raised bog, for both the DM and DS scenarios.

7.4.12 Early drafts of this HRA advised that modelled nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was found to be an error due to a factor not being amended in the calculation spreadsheet and was corrected for the 3rd Consultation Draft and this final report and is explained in more detail in Appendix 6.

7.4.13 The predicted minimum and maximum annual mean NO_X concentrations at Tully Bog in the DM and DS scenarios for the opening year and the minimum and maximum changes concentrations when comparing the two scenarios are detailed in Table 7.1. The tables and figures demonstrate that annual mean NO_X concentrations would be substantially below the EU Limit Value in both scenarios.

Table 7.1 *Range of Annual Mean NO_x Concentration ($\mu g/m^3$) at Tully Bog for DM and DS*

Annual Mean NO_x Concentration $\mu g/m^3$						
Road Phase (Year)	DM Value		DS Value		Change (DS-DM)	
	Min	Max	Min	Max	Min	Max
2 (2023)	3.4	7.8	3.7	7.8	+0.3	+0.0
3 (2028)	3.0	6.4	3.2	6.9	+0.2	+0.5

7.4.14 The predicted minimum and maximum nitrogen deposition rates for the Tully Bog in the DM and DS scenarios for the opening year and the minimum and maximum changes in rates when comparing the two scenarios are summarised in Table 7.2, and with distance from the nearest junction detailed in Table 7.3.

Table 7.2 *Range of Annual Mean* N-deposition Rate (kg N/ha/yr) at Tully Bog for DM and DS

N-Deposition Rate (kg/ha/y)								
Road Phase	DM Concentration		DS Concentration		Change (DS-DM)		Change across Tully Bog Transect	
	Min	Max	Min	Max	DS_{Min} - DM_{Min}	DS_{Max} - DM_{Max}	Min	Max
Phase 2 (2023)	18.75	18.86	18.76	18.87	+0.01	+0.01	0.00	+0.02
Phase 3 (2028)	16.94	17.03	16.96	17.05	+0.02	+0.02	+0.01	+0.02

Values rounded to 2 decimal points

Table 7.3 *Annual Mean* Nitrogen Deposition Rates at Tully Bog SAC

Total N-Deposition Rate (kg N/ha/yr)											
Distance from nearest affected road	2013 BY	Phase 2					Phase 3				
		2023 DM	2023 DS	DS-DM	% Increase in Total N Deposition*	% Change (Lower Critical Load)**	2028 DM	2028 DS	DS-DM	% Increase in Total N Deposition*	% Change (Lower Critical Load)**
0.6m	23.31	18.86	18.87	**0.01**	0.05%	0.20%	17.03	17.05	**0.02**	0.12%	0.40%
10m	23.12	18.79	18.81	**0.02**	0.11%	0.40%	16.98	17.00	**0.02**	0.12%	0.40%
20m	23.07	18.77	18.79	**0.02**	0.11%	0.40%	16.96	16.98	**0.02**	0.12%	0.40%
30m	23.04	18.77	18.79	**0.02**	0.11%	0.40%	16.96	16.98	**0.02**	0.12%	0.40%
40m	23.03	18.76	18.78	**0.02**	0.11%	0.40%	16.95	16.97	**0.02**	0.12%	0.40%
50m	23.02	18.76	18.78	**0.02**	0.11%	0.40%	16.95	16.97	**0.02**	0.12%	0.40%
60m	23.01	18.76	18.78	**0.02**	0.11%	0.40%	16.95	16.97	**0.02**	0.12%	0.40%
70m	23.01	18.75	18.77	**0.02**	0.11%	0.40%	16.95	16.97	**0.02**	0.12%	0.40%
80m	23.00	18.75	18.77	**0.02**	0.11%	0.40%	16.95	16.96	**0.01**	0.06%	0.20%
90m	23.00	18.75	18.77	**0.02**	0.11%	0.40%	16.95	16.96	**0.01**	0.06%	0.20%
100m	22.99	18.75	18.77	**0.02**	0.11%	0.40%	16.95	16.96	**0.01**	0.06%	0.20%
110m	22.99	18.75	18.77	**0.02**	0.11%	0.40%	16.95	16.96	**0.01**	0.06%	0.20%
120m	22.99	18.75	18.77	**0.02**	0.11%	0.40%	16.94	16.96	**0.02**	0.12%	0.40%
130m	22.99	18.75	18.77	**0.02**	0.11%	0.40%	16.94	16.96	**0.02**	0.12%	0.40%
140m	22.99	18.75	18.77	**0.02**	0.11%	0.40%	16.94	16.96	**0.02**	0.12%	0.40%
150m	22.98	18.75	18.76	**0.01**	0.05%	0.20%	16.94	16.96	**0.02**	0.12%	0.40%
160m	22.98	18.75	18.76	**0.01**	0.05%	0.20%	16.94	16.96	**0.02**	0.12%	0.40%
170m	22.98	18.75	18.76	**0.01**	0.05%	0.20%	16.94	16.96	**0.02**	0.12%	0.40%
180m	22.98	18.75	18.76	**0.01**	0.05%	0.20%	16.94	16.96	**0.02**	0.12%	0.40%
190m	22.98	18.75	18.76	**0.01**	0.05%	0.20%	16.94	16.96	**0.02**	0.12%	0.40%
200m	22.98	18.74	18.76	**0.02**	0.11%	0.40%	16.94	16.96	**0.02**	0.12%	0.40%

Values rounded to 2 decimal points

* also represents the proportional contribution of the A5WTC NOx to the critical load

** assumes 100% of the A5WTC NOx contributes to the critical load, displacing the equivalent contribution from other sources

Abbreviations: BY – Base Year DM – Do Minimum (no scheme in place) DS – Do Something (scheme in place)

7.4.15 The tables and figures demonstrate that nitrogen deposition critical loads are currently exceeded, and would continue to be exceeded with and without the Proposed Scheme.

7.4.16 Without the A5WTC scheme, N-deposition rates are predicted to be 18.86 kg N/ha/y in 2023 and 17.03 kg N/ha/y in 2028. This represents an N-deposition rate of 189 to 378% of the UNECE Critical Load for bog habitats in 2023 and 170 to 340% of the UNECE Critical Load for bog habitats in 2028.

7.4.17 With the A5WTC scheme, N-deposition rates are predicted to be 18.87 kg N/ha/y in 2023 and 17.05 kg N/ha/y in 2028. This represents an N-deposition rate of 189 to 378% of the UNECE Critical Load for bog habitats in 2023 and 170 to 341% of the UNECE Critical Load for bog habitats in 2028. .

7.4.18 Figure 7.1 shows the contribution of the existing A5 (DM scenario) and proposed A5WTC (DS scenario) to the background level of N-deposition rate at Tully Bog in relation to the lower critical load. The contribution from traffic related sources in both scenarios is a very small proportion of the total N-deposition. As it is difficult to see on Figure 7.1, the area surrounded by a green box on this figure has been enlarged on Figure 7.2.

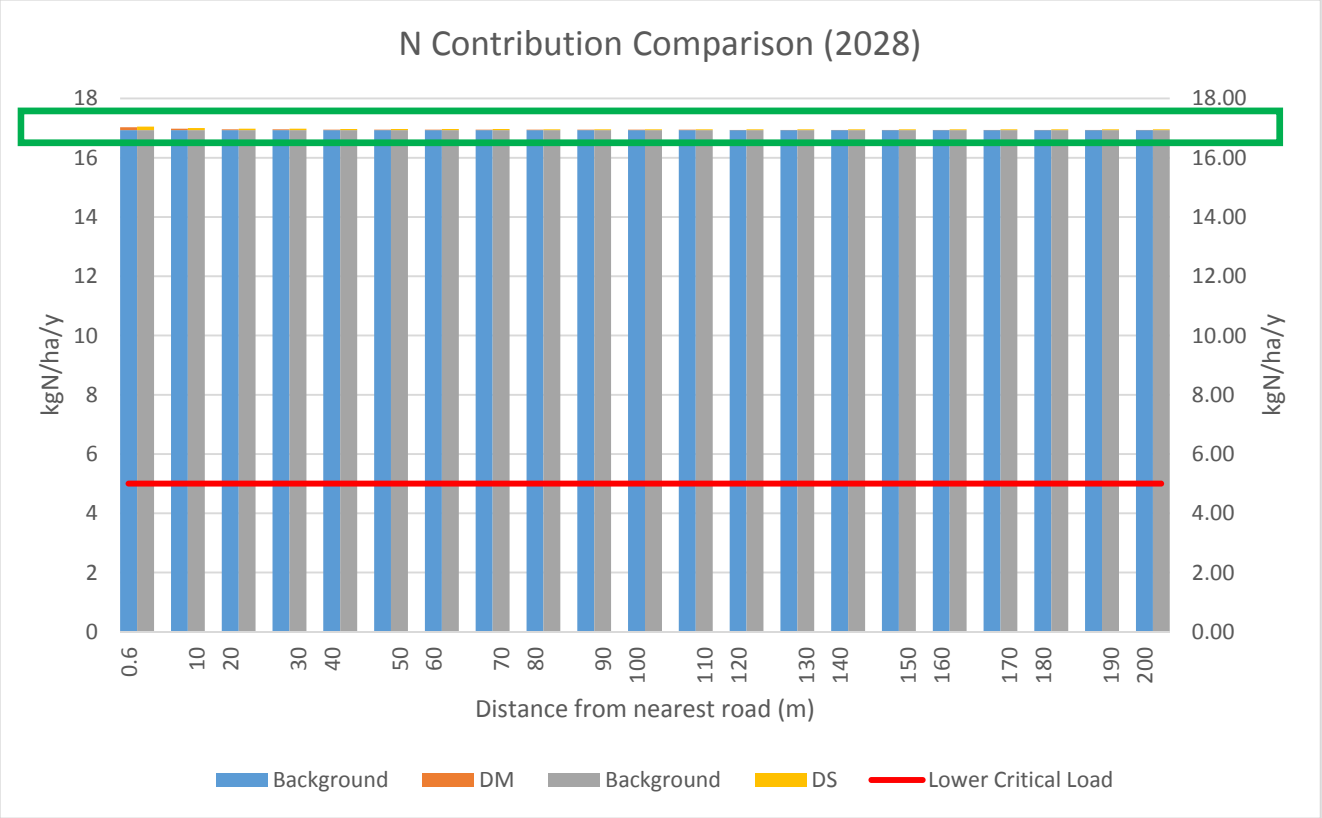

Figure 7-1: Nitrogen Contribution Comparison (2028)

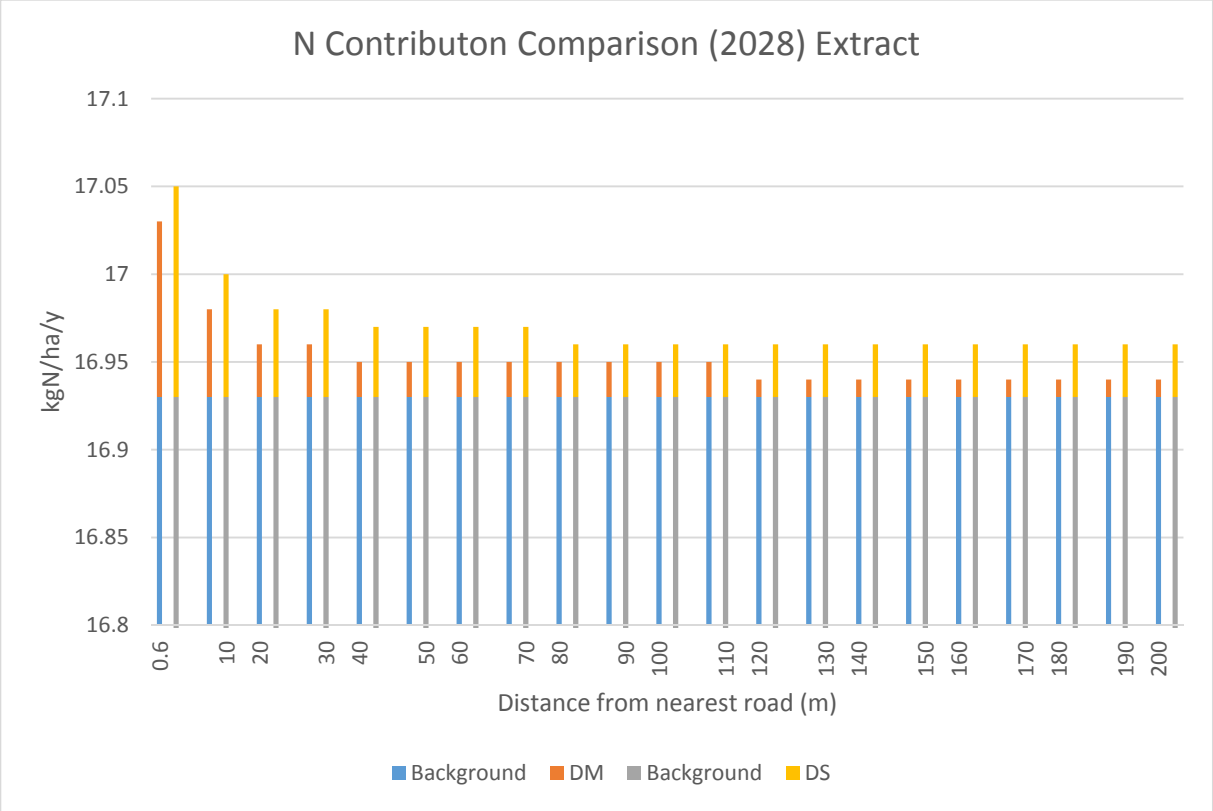

Figure 7-2: Nitrogen Contribution Comparison (2028) – Magnified extract

7.4.19 Current Conservation Objectives for Tully Bog SAC aim to reduce N-deposition rates to between 5 and 10kgN/ha/y. The current NOx deposition rates are predicted to reduce by approximately 19.4 to 19.8% of the current average deposition rate (21.13 kg/ha/yr) without the Scheme in place, by 2028. With the Proposed Scheme the reduction in N deposition rate will be marginally less, being 19.3% to 19.7% of the current average over this same time. Hence the impact of the Proposed Scheme will result in an additional N deposition rate of 0.11% to 0.12% over and above the existing rate, which will have a *de minimis* effect on the potential of the bog to reach its Conservation Objective.

7.4.20 Only a small proportion of the SAC would experience these slightly elevated levels, and detailed field surveys recorded a lack of competitive species, such as purple moor grass, on the raised bog surface that could take advantage of any increase in nitrogen levels to supplant the existing vegetation. The current floral assemblage present would be therefore not expected to alter significantly as a result of this negligible change in nutrient input, with the greater influence being the threat of hydraulic change.

7.4.21 These calculations are precautionary and have not considered the current UK Policy position which announced the intention that conventional car and van sales would end by 2040, and for almost every car and van on the road to be a zero emission vehicle by 2050[15], which would

[15] Regarding the UK policy, it states that, *"The UK was the first country in the world to announce in 2011 the intention that conventional car and van sales would end by 2040, and for almost every car and van on the*

result in a faster than expected decline in NOx deposition to the Bog from traffic related sources.

7.4.22 While the A5WTC will have a de minimis effect on N-deposition within the SAC, in light of the current condition of the bog as a result of agricultural and farming activities in the area, the Department as a responsible public body, has committed to re-wetting the bog, to improve its condition and to mitigate any potential effect of this small increase in N-deposition. The Department will work with DAERA - NIEA and the landowners in raising the water level in the bog, reducing its sensitivity to N-deposition and improving the conservation status of the site. The measures necessary to undertake this work will be undertaken either by agreement with the relevant landowners, or in default by vesting the relevant lands.

Bryophytes

7.4.23 Tully Bog supports a range of bryophytes, which are a group of organisms known to be sensitive to the effects of atmospheric deposition. Bryophytes are susceptible to direct toxicity from deposited N, particularly if this is deposited as dry deposition of ammonia NH_3, and by eutrophication of habitats leading to their being out-competed by species that can make more use of bioavailable N.

7.4.24 Notwithstanding that the current levels N deposition exceed the recommended critical load, the survey data indicate that there is currently no evidence that significant toxicity of bryophytes present at Tully Bog is occurring. . The predicted levels of N deposition occurring with the A5WTC are insufficient to significantly increase the levels of N toxicity of bryophytes over that which might occur in the absence of the scheme.

7.4.25 Ammonia (NH_3) is known to occur at lower levels than nitrogen oxides in the total contribution of atmospheric N deposition from roads. The A5WTC would not give rise to an increase in the proportion of NH_3 within the total N deposition arising from the road. As such, given that the increased load of total N deposited would not be significant, increases that might occur in NH_3 would also not be significant and therefore no effects of this are anticipated at the SAC.

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road to be a zero emission vehicle by 2050." The statement is echoed in the Carbon Plan that was produced in December 2011.

Accordingly, the proposed modal shift to electric and hybrid vehicles would bring an improvement to traffic related NO_x. Volvo are already transitioning by announcing that all cars manufactured from 2019 are to be electric or hybrid and there are renewed efforts to bring back the diesel car scrappage scheme. So these types of schemes would be beneficial on the long term.

The new published guidance can be found at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/633269/air-quality-plan-overview.pdf, with the Carbon Plan found at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf

7.4.26 Because of the low levels of increased N deposition, the small proportion of the SAC that could experience elevated levels, and the lack of competitive species in these areas, eutrophication and consequent out-competing is not expected to occur.

7.4.27 The predicted changes in concentrations of N deposition with the scheme of no more than +0.4% of the UNECE Critical Load are negligible in comparison with the levels of N deposition that are predicted to occur without the A5WTC. As such, the effects of the A5WTC on bryophytes will be negligible and not significant.

Construction Dust

7.4.28 Sources of dust during construction include:

- use of haul routes;
- transportation and storage of materials;
- materials handling, storage, stockpiling, spillage and disposal;
- excavations and earthworks;
- drilling and grouting works; and
- processing, cutting, crushing and grinding activities.

7.4.29 Receptors at high risk will be those located within 200m of the proposed working areas. The highest risk relates to receptors located within 50m of the proposed working areas and which are downwind of the predominant south-westerly winds associated with the area.

7.4.30 The contractors will be required to incorporate detailed dust control and management procedures within their Construction Environmental Management Plans (CEMPs). The plan will include the identification of a nominated Environmental Site Manager notification procedures where potentially significant dust generating activities are required, method statements for the control of dust in such locations and complaint receipt and management procedures to ensure issues, should they be raised by the public. Dust monitors will be established in areas of high risk.

7.4.31 Specific measures that will be adopted will include:

- roads and accesses will be kept clean;
- grout or cement-based materials will be mixed using a process suitable for the prevention of dust emissions;
- fine material will not be stockpiled to an excessive height in order to prevent exposure to wind and/or dust nuisance;
- dust generating activities (e.g. cutting, grinding and sawing) will be minimised and weather conditions considered prior to conducting potentially dust emitting activities;

- plant will be located away from site boundaries close to residential areas;
- water will be used as a dust suppressant where applicable;
- drop heights from excavators to crushing plant will be kept to a minimum;
- distances from crushing plant to stockpiles will be kept to the minimum practicable to control dust generation associated with the fall of materials;
- skips will be securely covered;
- soiling, seeding, planting or sealing of completed earthworks will be completed as soon as reasonably practicable following completion of earthworks;
- dust suppression and the maintenance of the surface of haul routes will be appropriate to avoid dust as far as practicable, taking into account the intended level of trafficking;
- appropriate speed limits on haul roads will be imposed and enforced for safety reasons and for the purposes of suppressing dust emissions;
- material will not be burnt on site; and
- engines will be switched off when not in operation.

7.4.32 Due to the distance from the proposed construction works, and the implementation of the above measures, it is concluded that the effects of any dust from the A5WTC on the raised bog habitats will be negligible and not significant.

7.5 Implication of Climate Change

7.5.1 As discussed above, long term climate change projections indicate that winters will become warmer and wetter, with more frequent and intensive extreme winter events, but that summers will become hotter and drier. The implications of these changes to the ecology of Tully Bog are likely to be mixed. On one hand the increased precipitation in winter will be beneficial for the bog, maintain the bog water table level for longer, and support regeneration of the bog margins, provided that current agricultural practices do not change. However hotter and drier summers may result in lowering of the water table level such that oxygen can penetrate more deeply into the peat layer, and limit peat forming activity.

7.5.2 The impacts of N deposition are known to be exacerbated by extremes in climate, particularly drought. Predictions on air quality as a consequence of long term climate change indicate that with more rainfall there would be an increase wet N deposition as precipitation (albeit of less

concentration than current), but then conversely, drier summers would increase dry deposition, in gas form[16].

7.5.3 The balance of these differing responses via potential benefits or impacts on Tully Bog will evolve over time and cannot be predicted with any certainty. As adopted by JNCC, and by NIEA, for this site, management of Tully Bog would be responsive to ongoing site condition monitoring[17] which will be implemented by NIEA. This monitoring occurs every five years, with the next review of the site's condition due in 2020.

7.6 In-Combination Effects

7.6.1 The Habitats Directive, NI Regulations and ROI Regulations require consideration to be given to potentially combined effects of a development project and other projects on Natura 2000 sites. Several proposed development projects lying within a zone of potential influence[18] of Tully Bog SAC, which have either been approved in outline or fully approved in accordance with the relevant development consent regime for the form of development proposed, have been considered to date in the context of this requirement for the currently proposed A5WTC (see Appendix 1, Figure 2).

7.6.2 Excluding proposed developments which may have an air quality impact on the SAC, between 2009 and 2016 the planning permissions granted are for small individual dwellings or alterations to dwellings, with the exception of a floodlighting permission for an existing playing field and is unlikely to impact on the conservation objectives of the site.

7.6.3 No other road schemes are proposed which would alter traffic patterns such that any increase in emissions would be recorded within the SAC.

7.6.4 Proposals which may have an air quality impact on Tully Bog are listed in Table 7.4. The potential contribution to N deposition is calculated from information available on the planning portal. A precautionary approach has been taken, assuming that the contribution of these

[16] APIS states that, *"In addition, the loading of N in wet deposition depends not only on the amount of N but also the amount of precipitation. In the east, N concentrations can be quite high due to the low rainfall, whereas in the west the rainfall is much higher but the concentrations tend to be lower. Reduced N will dominate deposition in rural areas while oxidised N dominates in urban conurbations."*
With regard to the assessment, the methodology prescribed by DMRB Vol 11, Section 3, Annex F – Assessment of Designated Sites (HA207/07) was followed. In that, dry N deposition forms the focus of the DMRB assessment methodology. More information is sourced at http://www.apis.ac.uk/overview/pollutants/overview_N_deposition.htm

[17] Monitoring of SACs takes place on using two monitoring techniques. Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the bog and associated habitats through desiccation). These longer-term changes will be picked up by monitoring of the feature via Site Condition Assessment - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

[18] NIEA policy includes examining planning applications of intense agriculture (NH_3) within 7.5km, oxides of N (NO_x) (inc. roads) within 200m, gas turbines (<15MW) within 500m, and gas turbines (>15MW) within 7.5km.

developments will not reduce over time, and that the worst case deposition rate for each of the DM (17.03 kgN/ha/y) and DS (17.05 kgN/ha/y) scenarios applies. Figures given are for the 2028 prediction year.

Table 7.4 *Planning Applications which may have Air Quality Impacts on Tully Bog*

Planning Application Reference	Nature of Proposal	Approx.Distance from Tully Bog SAC	Development related N deposition rate (kgN/ha/y)	% Contribution to N-deposition – without A5WTC (DM)*	% Contribution to N-deposition – with A5WTC (DS)*	% Contribution development related N-deposition to lower critical
K/2014/0395/F	Poultry	4km	0.006	0.038	0.038	0.13
LA10/2016/1006/F	Anaerobic Digester Plant	2km	0.012	0.072	0.072	0.25
LA10/2016/1151/F	Poultry	2km	0.010	0.061	0.061	0.21
LA10/2017/0471/F	Poultry	3km	0.009	0.053	0.053	0.18
		Total	**0.038**	**0.225**	**0.225**	**0.77**

***** Also represents the proportional contribution of N to the Critical Load

****** Assumes 100% of the source N contributes to the Critical Load, displacing the equivalent contribution from other sources.

7.6.5 Thus in-combination effects are a total N-deposition contribution of approximately 0.34 to 0.35% over and above the existing rate (1.17% of the lower critical load). This contribution is *de minimis* and not significant in relation to the integrity of the bog or its conservation objectives.

7.7 Mitigation

7.7.1 Notwithstanding the conclusions that the A5WTC would not cause any effect to the hydraulic condition of Tully Bog, and the *de minimus* contribution of the A5WTC to the existing levels of N deposition to the site, a range of potential mitigation measures was examined, particularly if these could alleviate existing contributions to the sites degradation. These included:

1 Blocking up of drains
2 Management of scrub invasion
3 Vegetation or engineered screening (air quality)
4 Speed limits on roads (air quality); and
5 Measures to ensure additional protection against fire during construction.

7.7.2 With reference to point 1, bog systems which have a low water table are more sensitive to N-deposition, (which is why the lower critical load has been used to calculate increase percentages for this project[19]).

7.7.3 The bog is in unfavourable conservation status and currently the State is taking no action to remedy the situation. DfI as a responsible Public Body will implement one of the following approaches to mitigate the *de minimis* increase in N-deposition by raising the water table, reducing the sensitivity of the bog to N-deposition and improving the conservation status of the site (Rochefort et al 1995, Smolders et al 2003, Howie et al 1998, Malterer et al 1998, Money 1995, Morgan-Jones et al 2005):

- Enter into agreements with the landholders to block drains and stop drainage from the bog; or
- If the above is not acceptable to any of the landowners, DfI will purchase by agreement or vest the applicable areas of the SAC and undertake the works.

7.7.4 Potential scrub management will be discussed with NIEA and considered for implementation during re-wetting works (point 2).

7.7.5 The potential use of barriers (point 3) to reduce atmospheric contribution of N deposition arising from the Proposed Scheme was investigated. However, as barriers are only effective when placed close to the source of emissions, and only for a short distance downwind of the barrier, the separation of the A5WTC from the SAC of over 200m means that no significant reduction in N deposition would accrue through the inclusion of such a structure. Given the insignificant levels of N deposition increase arising from the Proposed Scheme, and the ineffectiveness of barriers in reducing this further, it is not intended that barriers should be introduced.

7.7.6 Air quality N contributions are predominantly from the agriculture sector, atmospheric in nature and from surrounding areas, and assumed to be primarily deposited by precipitation. Vegetation screening, although known to be effective in absorbing some air pollution in urban environments, is less effective in open areas and is not warranted given the *de minimus* N deposition that would result from the road. Lowering speed limits can potentially increase air pollution and result in safety issues on the carriageway – again this measure is not warranted given the insignificant increase in deposition as a result of the A5WTC (points 3 and 4 above).

7.7.7 Construction works will occur 500m from Tully Bog and the contract documents do not permit the burning of any materials in relation to the construction works (point 5).

[19] http://www.apis.ac.uk/guidance-applying-critical-load-range-atmospheric-nitrogen-deposition-bog-habitats-uk

8 Summary

8.1.1 Tully Bog SAC has been identified as a Natura 2000 site with a relationship to the proposed A5WTC which requires that it should be considered in the context of the EC Habitats Directive, as transposed by the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2012 and the European Communities (Natural Habitats) Regulations 1997 (as amended) in the Republic of Ireland as amended by European Communities (Natural Habitats) (Amendment) Regulations, 2005.

8.1.2 The SAC has been subject to a process of screening based on the guidance provided in HD 44/09 of Volume 11 of the Design Manual for Roads and Bridges. It has been concluded:

- the proposed scheme is a project which is not connected with or necessary to the management of the SAC;
- the likelihood of the proposed scheme having a significant effect on the sites cannot be excluded on the basis of objective information; and
- that Stage 2 Appropriate Assessments should be undertaken.

8.1.3 Following the Stage 2 Appropriate Assessment it is concluded:

- The A5WTC has been designed to avoid features related to Natura 2000 site as far as possible;
- There is a high level of knowledge of the qualifying features (habitats and species) in the study area;
- Best practice mitigation has been included in the scheme design;
- Recognising that while the A5WTC has a *de minimis* effect on N deposition, the Department has committed to re-wetting the bog, mitigating the potential effects of this increase;
- Based on the best scientific knowledge available, the impacts of the A5WTC Scheme will not have a significant effect on the integrity or conservation objectives of the SAC.

8.1.4 The information provided in this report indicates the proposed scheme will not have an impact on the integrity of the designated site either independently or in-combination with other projects.

9 References

Department of Finance and Personnel (2006) A Sustainable Development Strategy for NI – first steps towards sustainability. The document can be found at: http://www.ofmdfmni.gov.uk/sustain-develop.pdf

Department for Regional Development in NI (2008) 'Shaping Our Future' - Adjustments to the Regional Development Strategy (RDS) 2025

Derry City Council (2008) Wildlife Action in Derry ~ Londonderry 2008 – 2013 Derry ~ Londonderry Local Biodiversity Action, Derry City Council, Derry.

DMRB (2008a) Volume 11 Section 2, Part 1– HA 201/08 Environmental Impact Assessment

DMRB (2008b) Volume 11 Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects

DMRB (2009) Volume 11 Section 4, Part 1 – HD 44/09 Assessment of Implication (of Highways and/or roads projects) on European Sites (including Appropriate Assessment)

Environment Agency (2003) River Habitat Survey in Britain and Ireland Manual. Environment Agency

Environment Heritage Service (1993) Conserving peatland in NI – a Statement of Policy. Environment Heritage Service, Belfast.

European Commission (2000) Managing Natura 2000 Sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

European Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.

European Council (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

European Court of Justice (2004) Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Case C-127/02. European Court reports 2004 Page 00000

Heritage Council (2000) A Guide to Habitats in Ireland. The Heritage Council, Dublin.

HMSO (1995) The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995

Howie SA, Whitfield PH, Hebda RJ, Munson TG, Dakin RA, Jeglum JK (2009) Water table and vegetation response to ditch blocking: restoration of a raised bog in Southwestern British Columbia. Can Water Resour J 34:381–392

Institute of Ecology and Environmental Management (IEEM) (2006) Guidelines for Ecological Impact Assessment in the United Kingdom. Full text is available at the following website: http://www.ieem.org.uk/ecia/index.html

Joint Agencies. Department of Food Environment and Rural Affairs (DEFRA), Department of Environment and Climate Change (DECC), Met Office, Environment Agency (EA) 2016. Is UKCP09 still an appropriate tool for adaptation planning? Land Projections April 2016

Labaz, J.C. and Butcher, D.P., 2004. Wedholme Flow: investigation of the effects of Environment Agency drainage maintenance regimes on raised mire SACs and adjacent agricultural land in Cumbria & effects of drain maintenance regimes on raised bog habitat and agricultural land. Nottingham Trent University.

Lindsay, R.A. (1995) Bogs: The Ecology, Classification and Conservation of Ombrotrophic Mires. Perth, Scottish Natural Heritage

Malterer T, Johnson K, Stewart J (1998) Peatland Restoration and Reclamation. Proceedings 1998 international Peat symposium, Duluth, Minnesota, USA

Money RP (1995) Re-establishment of a Sphagnum dominated flora on cut-over lowland raised bogs. In: Wheeler BD, Shaw SC, Fojt WJ, Robertson RA (eds) Restoration of temperate wetlands. Wiley, Chichester, pp 405–422

Morgan-Jones W, Poole JS, Goodall R (2005) Characterisation of hydrological protection zones at the margins of designated lowland raised peat bog sites. Joint Nature Conservation Committee Report, Peterborough 365:3–87

Mouchel (2008a) A5 WTC Pre-Phase 2 Ecological Baseline Assessment

Mouchel (2008b) A5 WTC Phase 2 Ecological Assessment Report

Mouchel (2009a) Appraisal of Habitats and Flora, Phase 4 Technical Appendix

Mouchel (2010) A5 Western Transport Corridor Environmental Statement Volumes 1 to 3. Document Ref 718736-3000-R-008

Mouchel (2010a) A5 Western Transport Corridor Environmental Statement (Volume 16) Road Drainage and the Water Environment

Mouchel (2010b) A5 Western Transport Corridor Environmental Statement (Volume 8) Air Quality

Nature Conservancy Council (1989) Guidelines for the Sections of Biological Sites of Special Scientific Interest NCC, Peterborough

NI Biodiversity Group (2002) NI Biodiversity Strategy. Environment and Heritage Service, Belfast.

NI Biodiversity Action Plan (NIBAP) (2005) Full texts for all habitats referred to available at: http://www.ni-environment.gov.uk/biodiversity/hap_uk/hap_ni.htm

Omagh District Council (2008) Omagh District Local Biodiversity Action Plan, Omagh District Council, Omagh

Payne RJ (2014) The exposure of British peatlands to nitrogen deposition, 1900–2030 Biological and Environmental Science, University of Stirling, UK. Mires and Peat, Volume 14 (2014), Article 04, 1–9.

Rivers Agency Strategic Flood Map (NI) Rivers and Sea. Accessed through http://www.riversagencyni.gov.uk/index/stategic-flood-maps.htm

Rochefort L, Gauthier R, Lequéré D (1995) Sphagnum regeneration—toward an optimisation of bog restoration. In: Wheeler BD, Shaw SC, Fojt WJ, Robertson RA (eds) Restoration of temperate wetlands. John Wiley & Sons, Chichester, pp 423–434

Scottish Executive (2000) River Crossings and Migratory Fish: Design Guidance. Accessed through http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp on 7th November 2008.

Scottish Environment Protection Agency (SEPA) (2008) Engineering in the Water Environment, Good Practice Guide: Construction of River Crossings.

Smolders AJP, Tomassen HBM, Van Mullekom M, Lamers LPM, Roelofs JGM (2003) Mechanisms involved in the re-establishment of Sphagnum-dominated vegetation in rewetted bog remnants. Wetl Ecol Manag 11:403–418

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Appendices

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Appendix 1: Figures 1 to 6

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N

Lisnagir Road

Tully Road

A5 Beltany Road

Rash Road

Drumlegagh Road South

Junction 11

Tully Bog SAC

Fairy Water

Todds Road

A5 Beltany Road

Strule River

Mellon Park Drive

Gillygooly

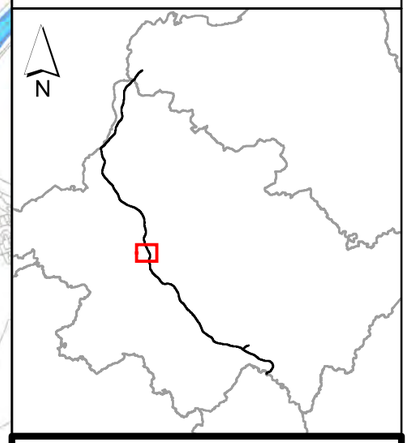
Omagh

Legend

- PROPOSED SCHEME
- EXISTING A5
- TULLY BOG SAC
- RIVERS
- SETTLEMENT

0 0.5

Kilometres



Client

transportni

Project

A5 WTC Western Transport Corridor

mouchel building great relationships

Drawing Title

INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - TULLY BOG SAC

Figure No

Figure 1

Version

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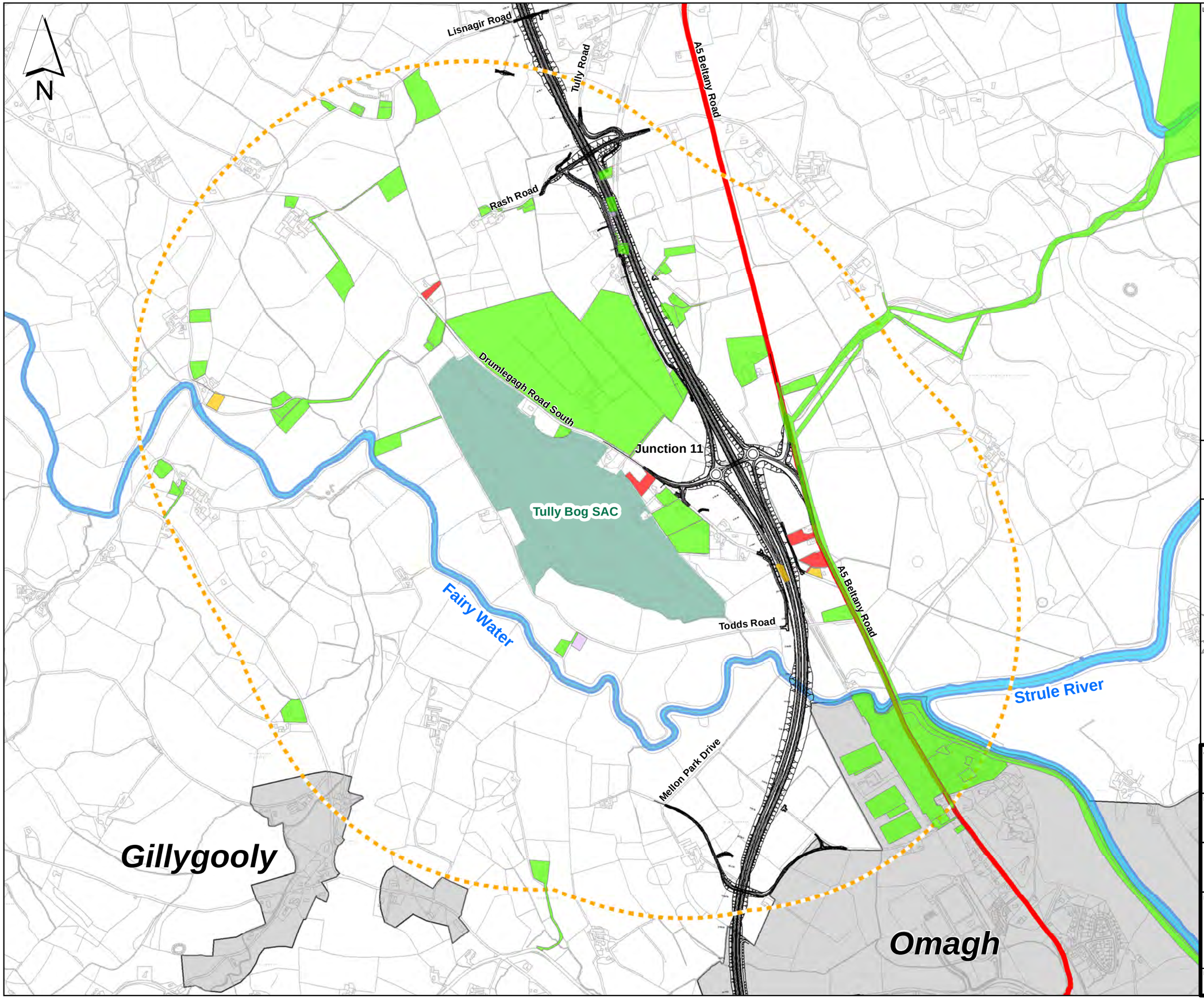

Legend

- PROPOSED SCHEME
- EXISTING A5
- TULLY BOG SAC
- RIVERS
- SETTLEMENT
- 1 Km Buffer of Tully Bog

PLANNING APPLICATIONS

- GRANTED
- REFUSED
- WITHDRAWN
- UPHELD

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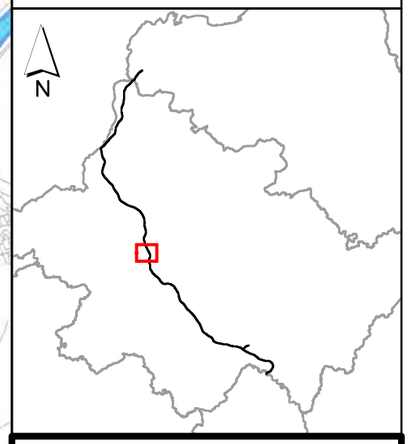
Kilometres



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Project: A5 WTC Western Transport Corridor

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INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - TULLY BOG SAC PLANNING APPLICATIONS WITHIN 1KM

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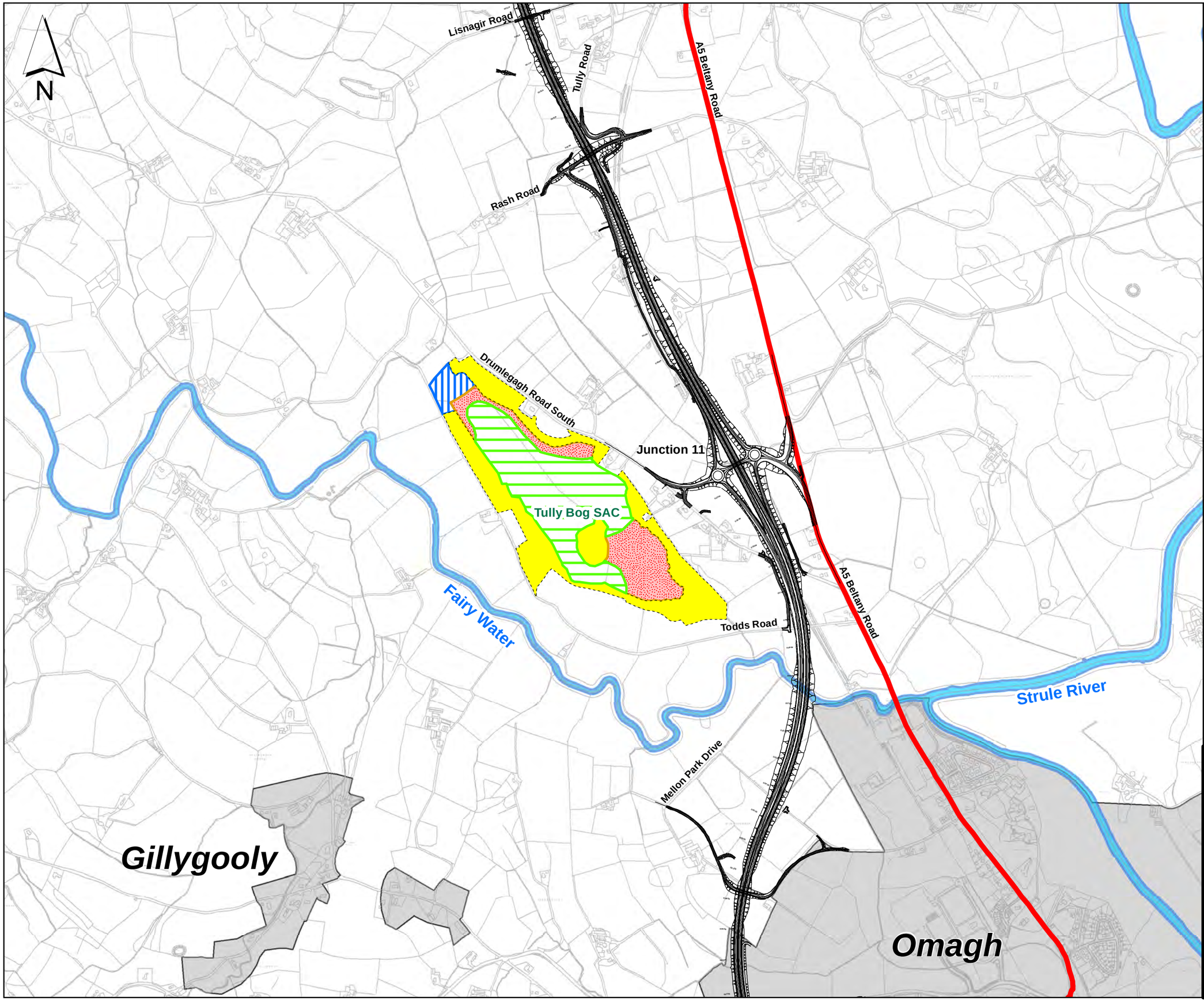

Legend

- PROPOSED SCHEME
- EXISTING A5
- RIVERS
- SETTLEMENT

Tully Bog NVC Identity Areas

- M18
- M19a
- Unclass
- W4a

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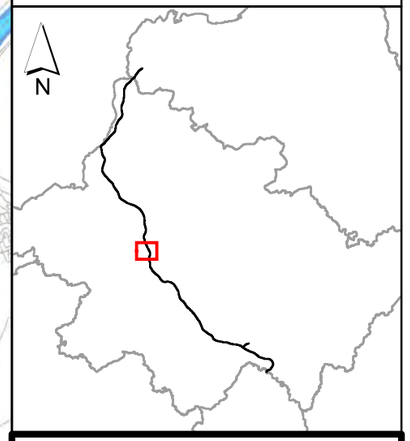

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INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - TULLY BOG SAC NVC FLORA COMMUNITIES

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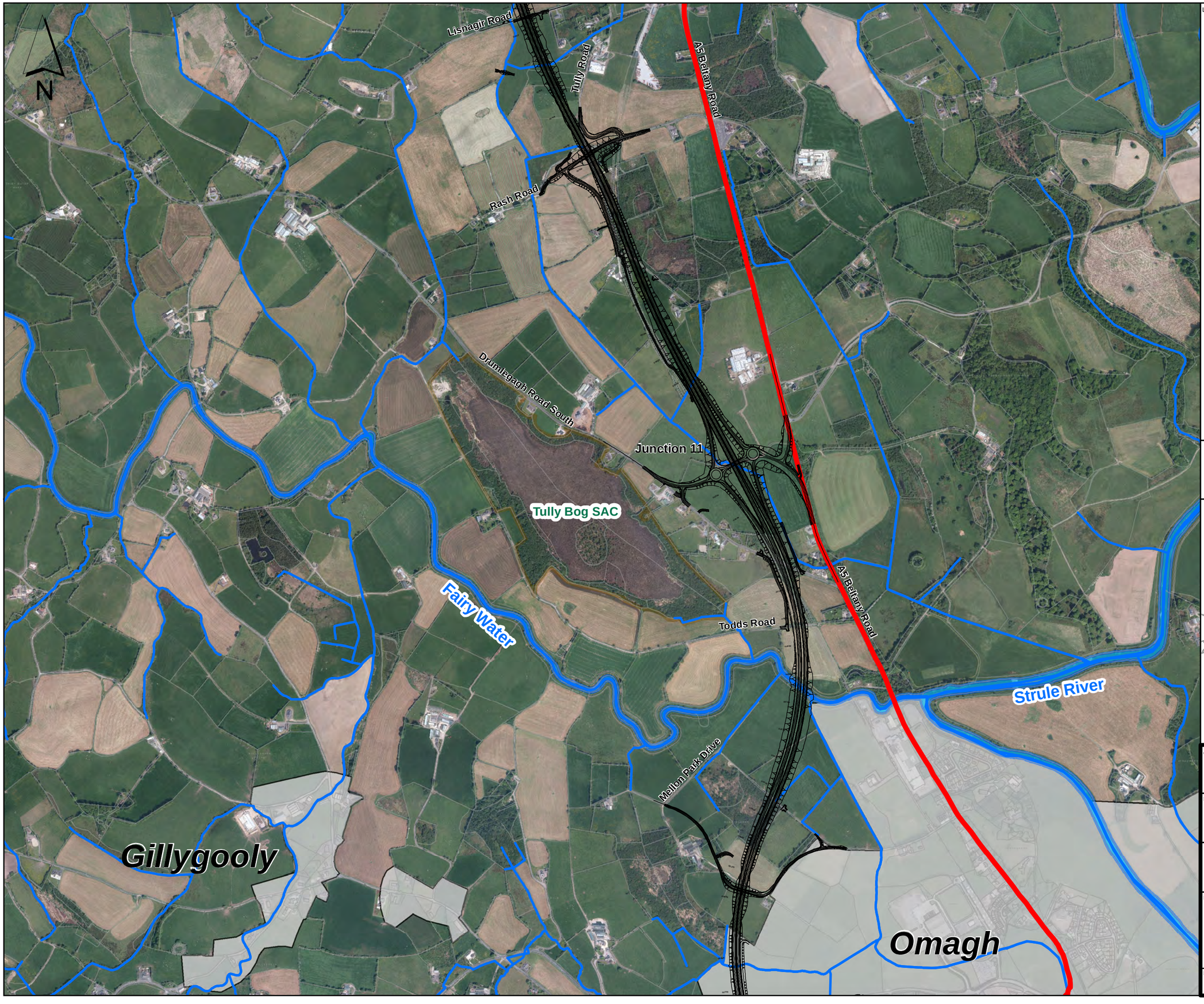

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- TULLY BOG SAC
- SETTLEMENT

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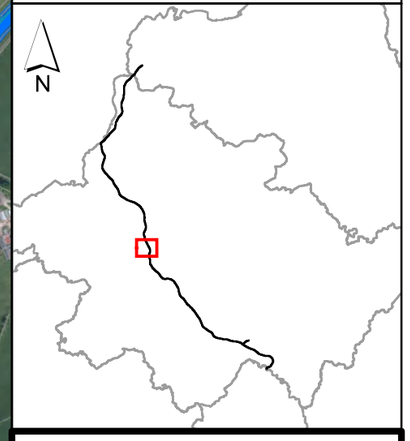

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INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT - TULLY BOG SAC DRAINAGE FEATURES

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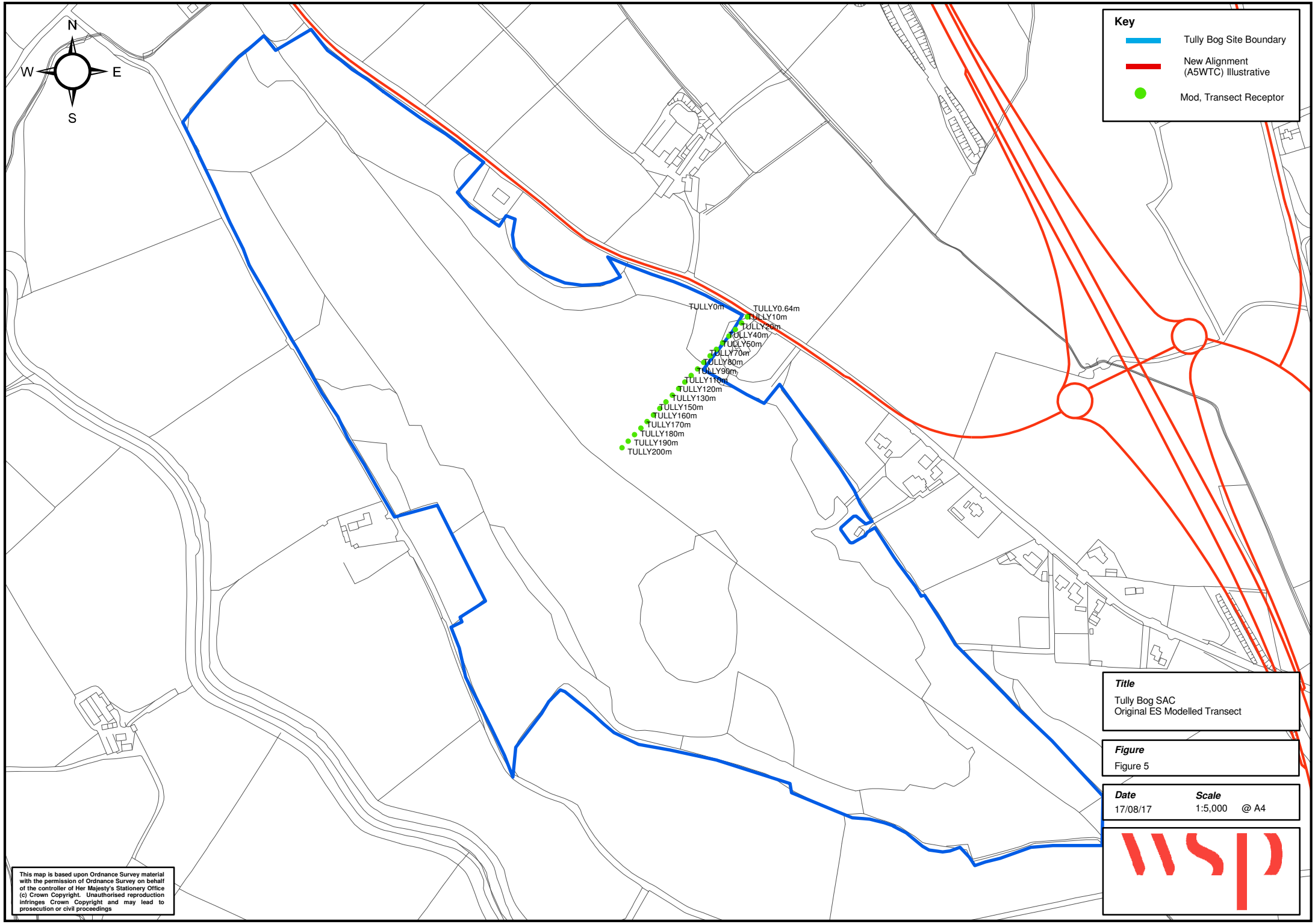

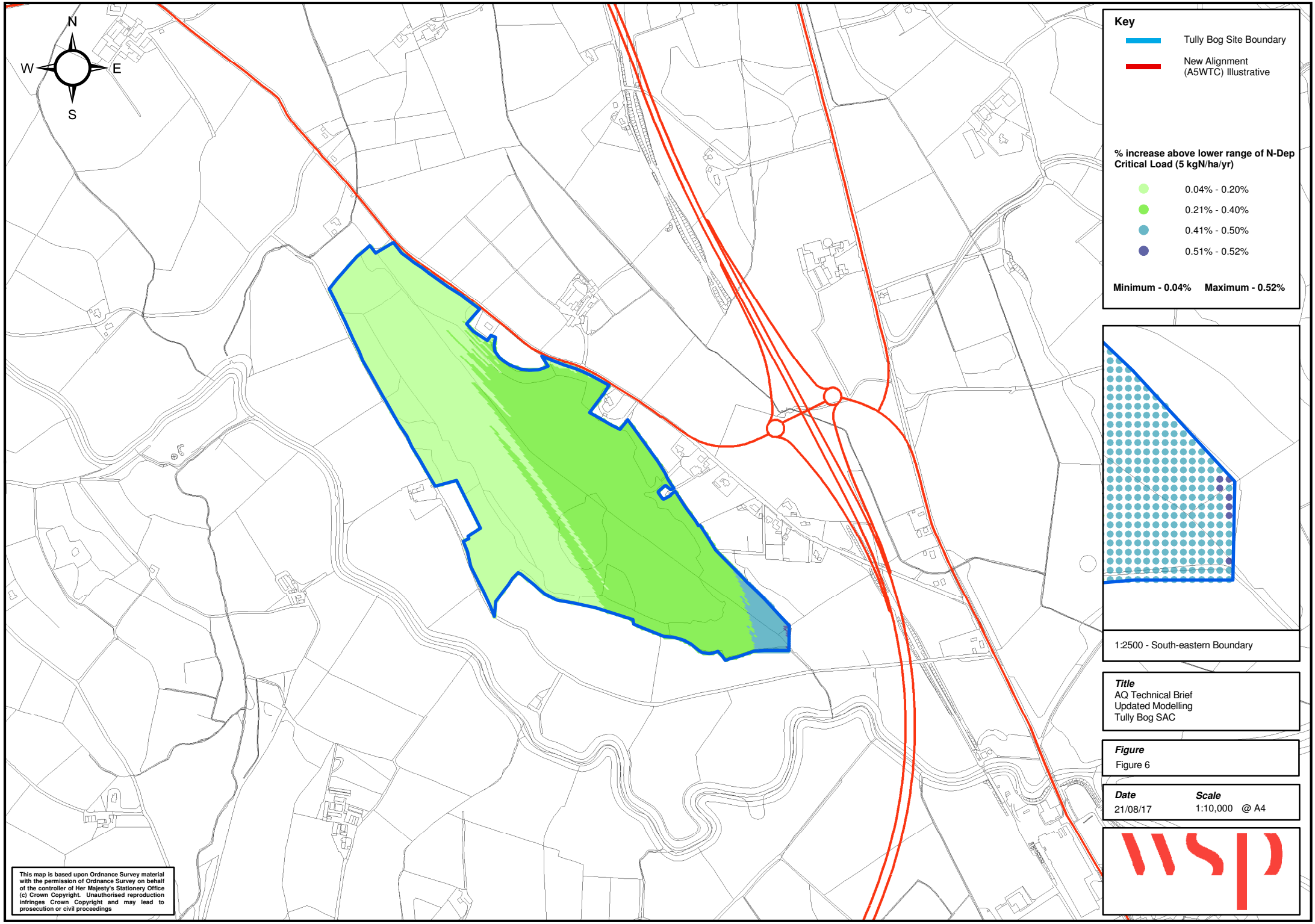

Appendix 1: Sheet 1 to 24

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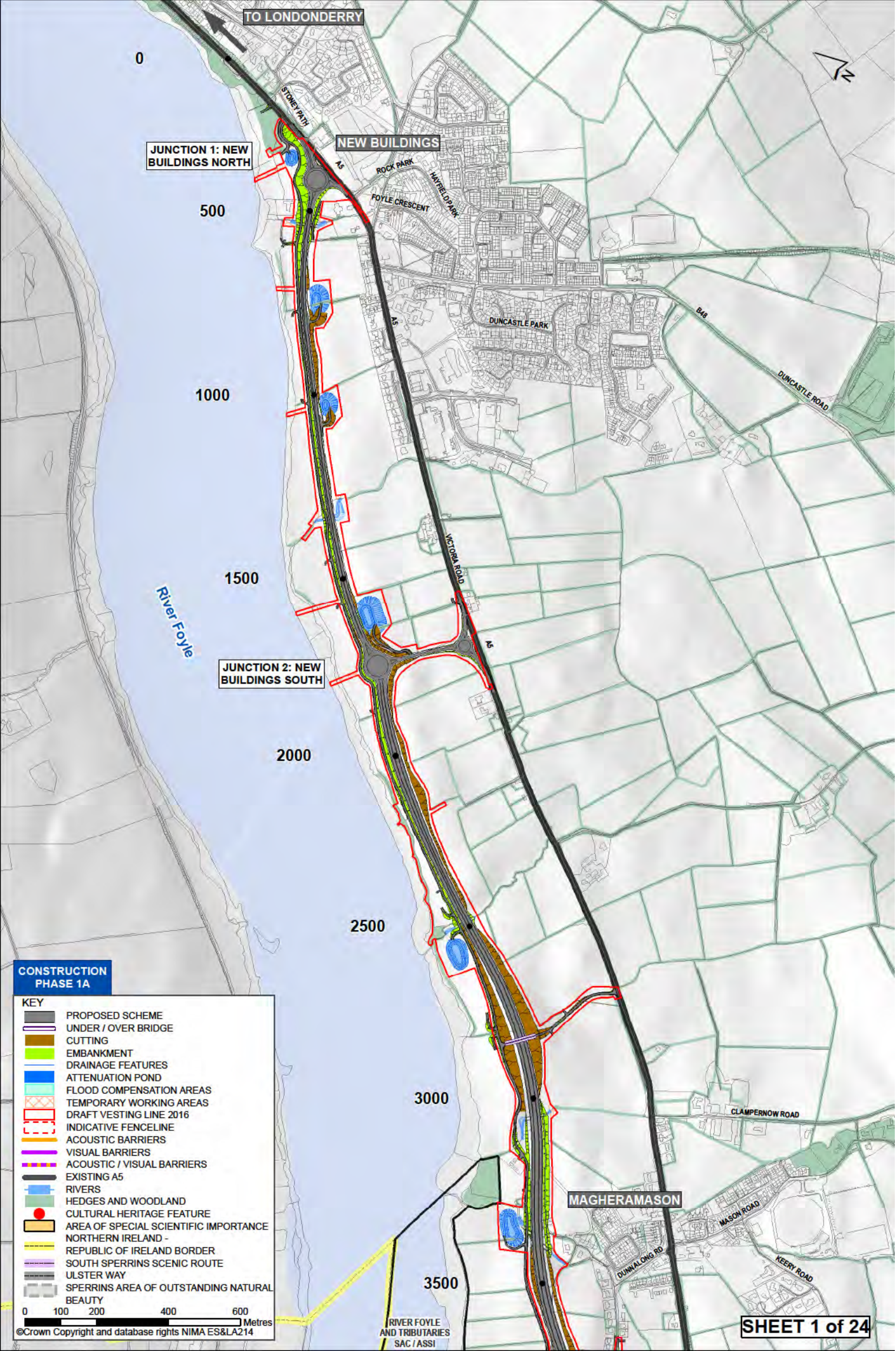
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DUNCASTLE PARK
B48
DUNCASTLE ROAD
1000
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River Foyle
VICTORIA ROAD
A5
JUNCTION 2: NEW BUILDINGS SOUTH
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MAGHERAMASON
MASON ROAD
DUNNALONG RD
KEERY ROAD
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RIVER FOYLE AND TRIBUTARIES SAC / ASSI
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FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
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ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
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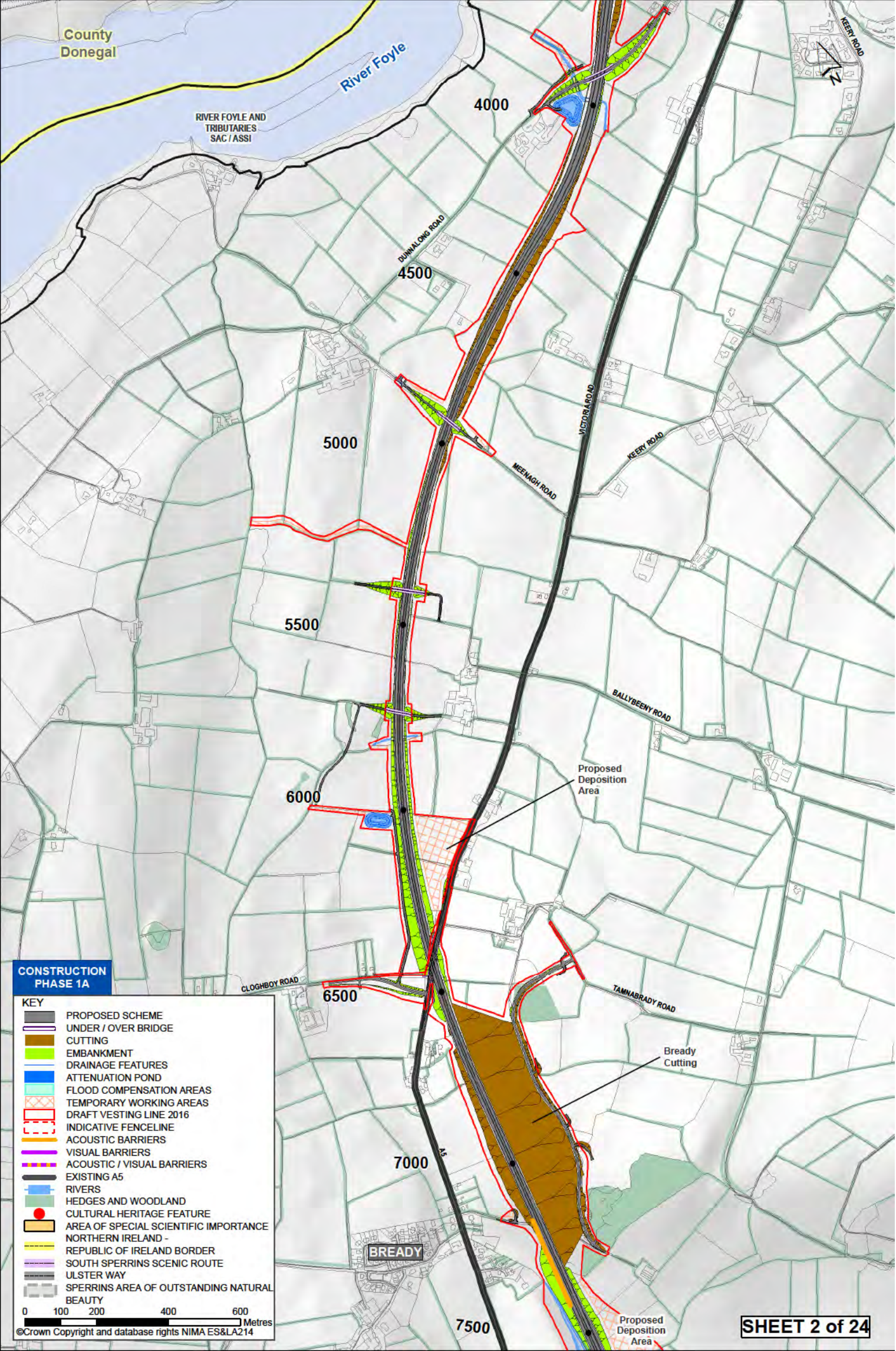
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SOUTH SPERRINS SCENIC ROUTE
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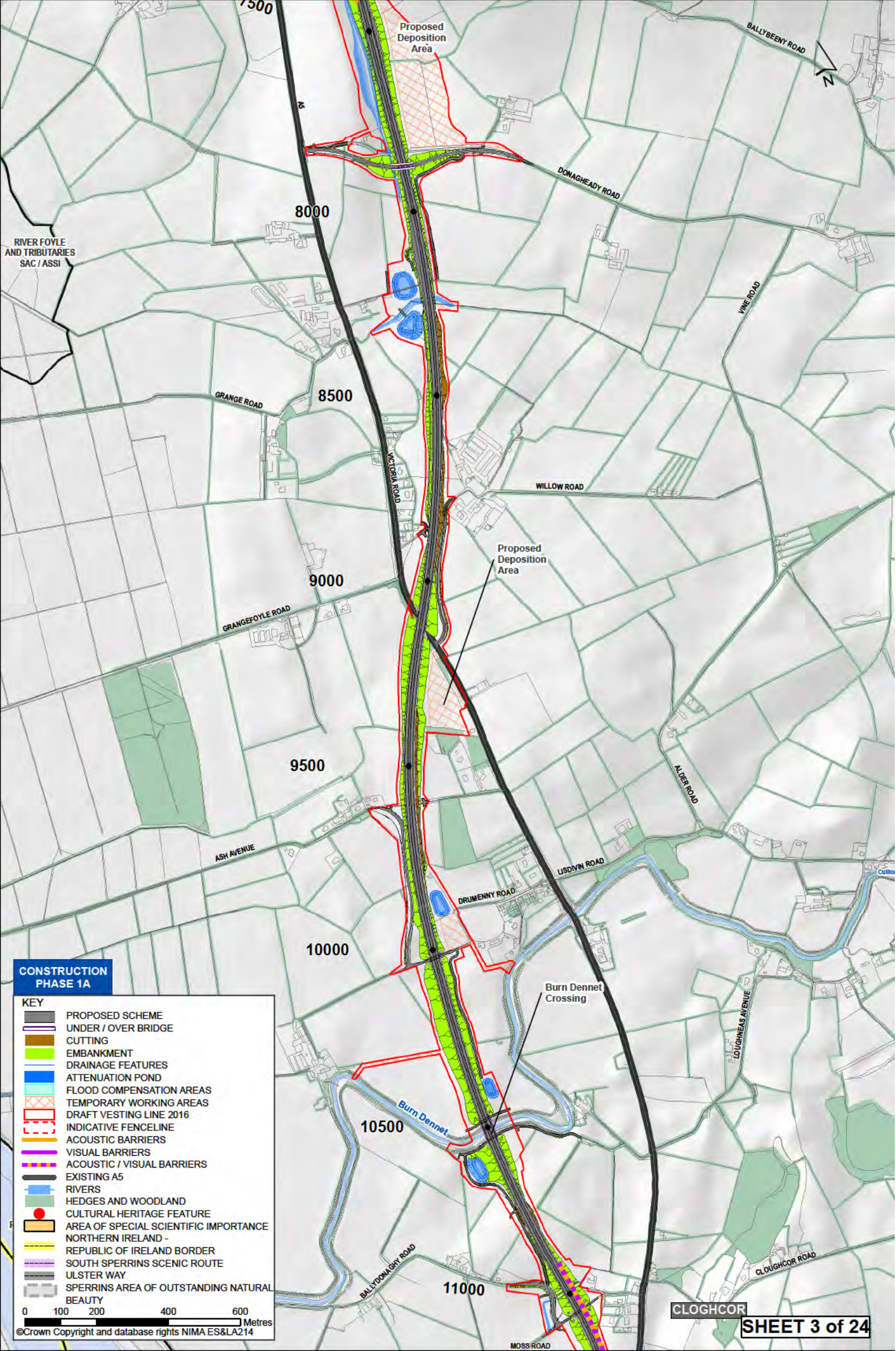
7500
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9500
10000
10500
11000
Proposed Deposition Area
Proposed Deposition Area
Burn Dennet Crossing
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BALLYBEENY ROAD
DONAGHEADY ROAD
VINE ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
GRANGE ROAD
VICTORIA ROAD
WILLOW ROAD
GRANGEFOYLE ROAD
ALDER ROAD
ASH AVENUE
LISDIVIN ROAD
DRUMENNY ROAD
LOUGHNEAS AVENUE
Burn Dennet
BALLYDONAGHY ROAD
CLOUGHCOR ROAD
MOSS ROAD
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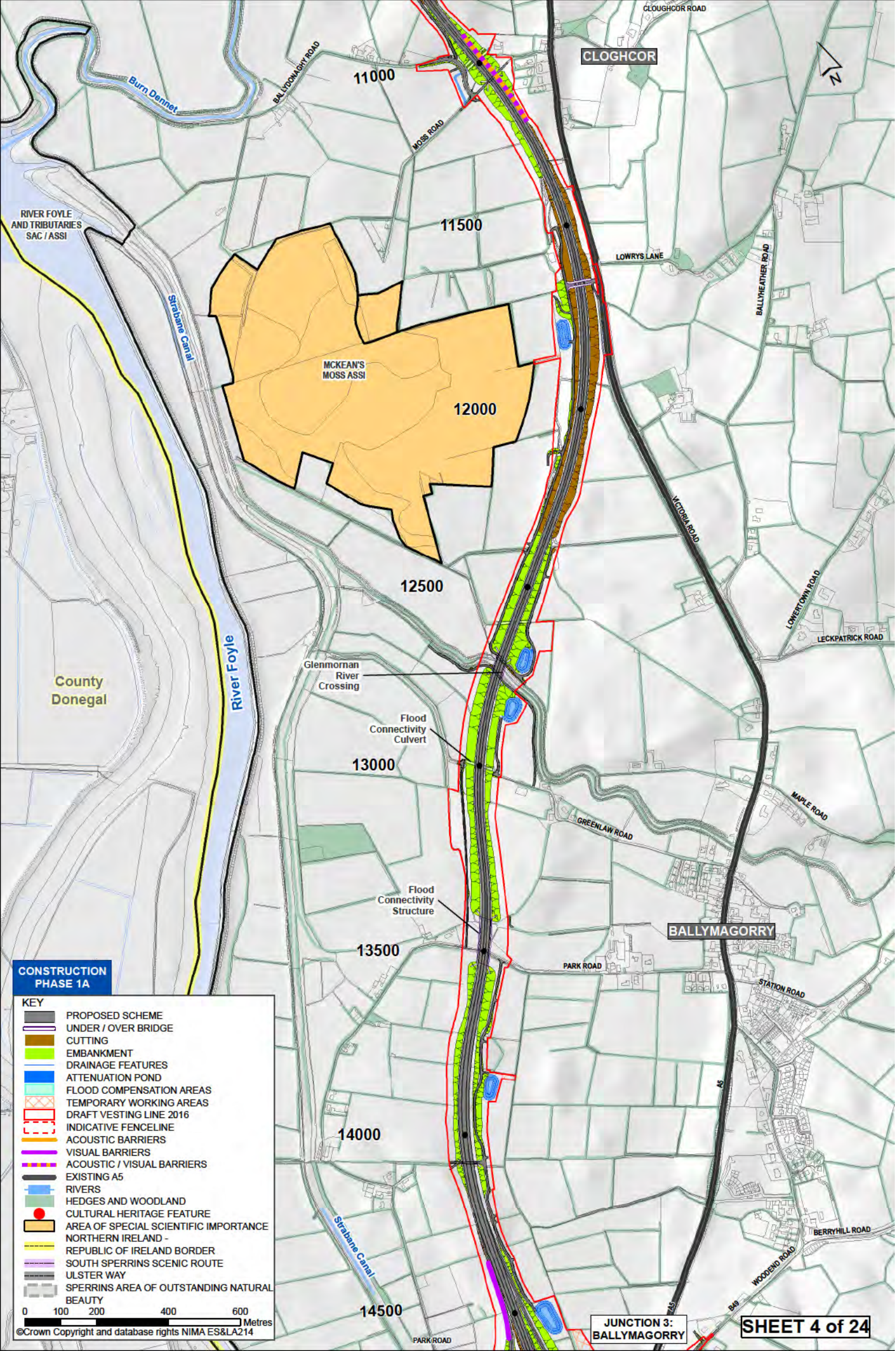
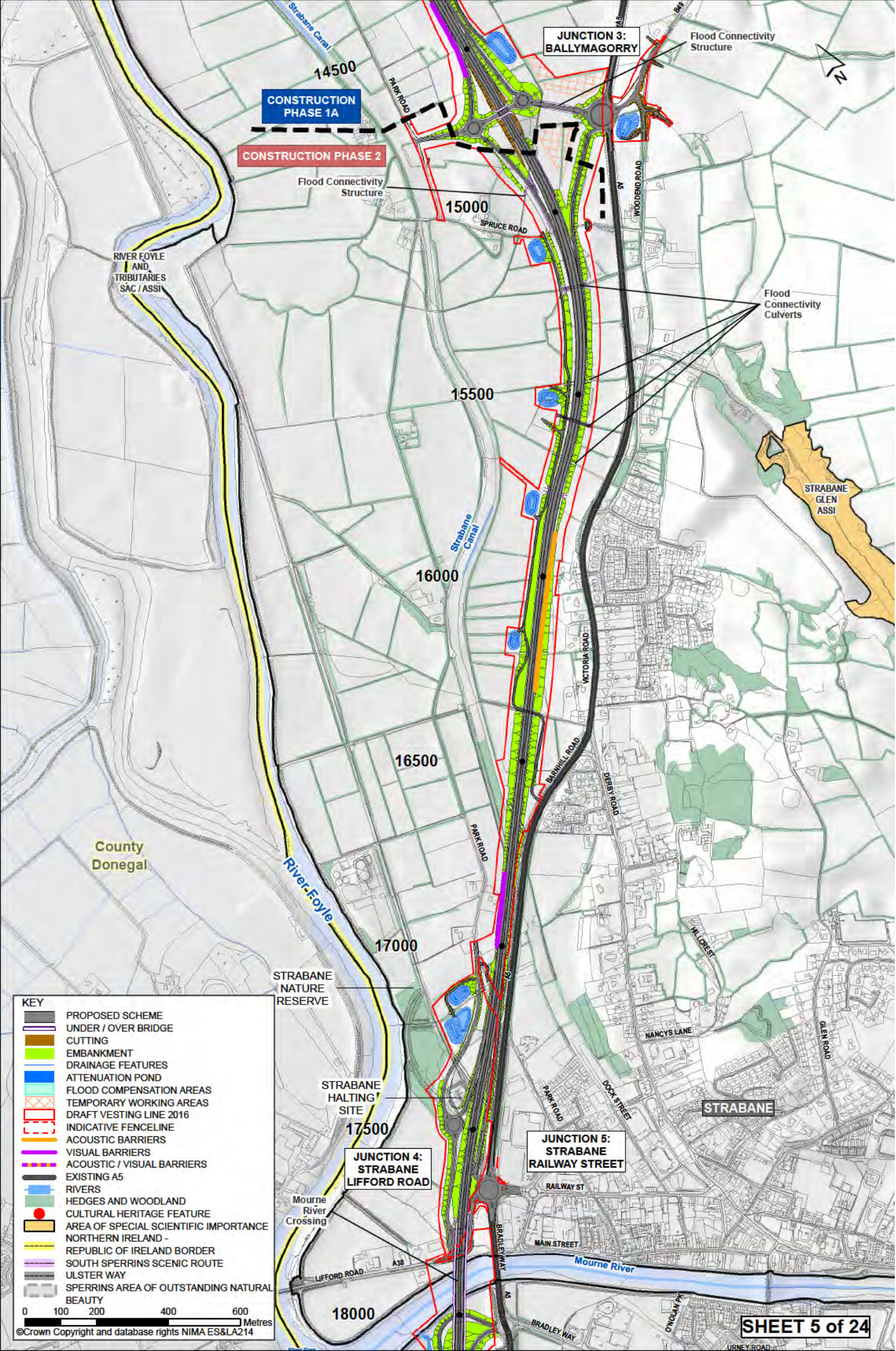
SHEET 3 of 24




JUNCTION 3: BALLYMAGORRY
Flood Connectivity Structure
CONSTRUCTION PHASE 1A
CONSTRUCTION PHASE 2
Flood Connectivity Structure
14500
15000
15500
16000
16500
17000
17500
18000
PARK ROAD
SPRUCE ROAD
WOODEND ROAD
A5
B49
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Flood Connectivity Culverts
STRABANE GLEN ASSI
Strabane Canal
VICTORIA ROAD
BARNHILL ROAD
DERBY ROAD
PARK ROAD
County Donegal
River Foyle
STRABANE NATURE RESERVE
MILCREST
NANCYS LANE
GLEN ROAD
STRABANE HALTING SITE
PARK ROAD
DOCK STREET
STRABANE
JUNCTION 5: STRABANE RAILWAY STREET
RAILWAY ST
JUNCTION 4: STRABANE LIFFORD ROAD
Mourne River Crossing
BRADLEY WAY
MAIN STREET
Mourne River
A38
LIFFORD ROAD
A5
BRADLEY WAY
O'NEILL PK
URNEY ROAD
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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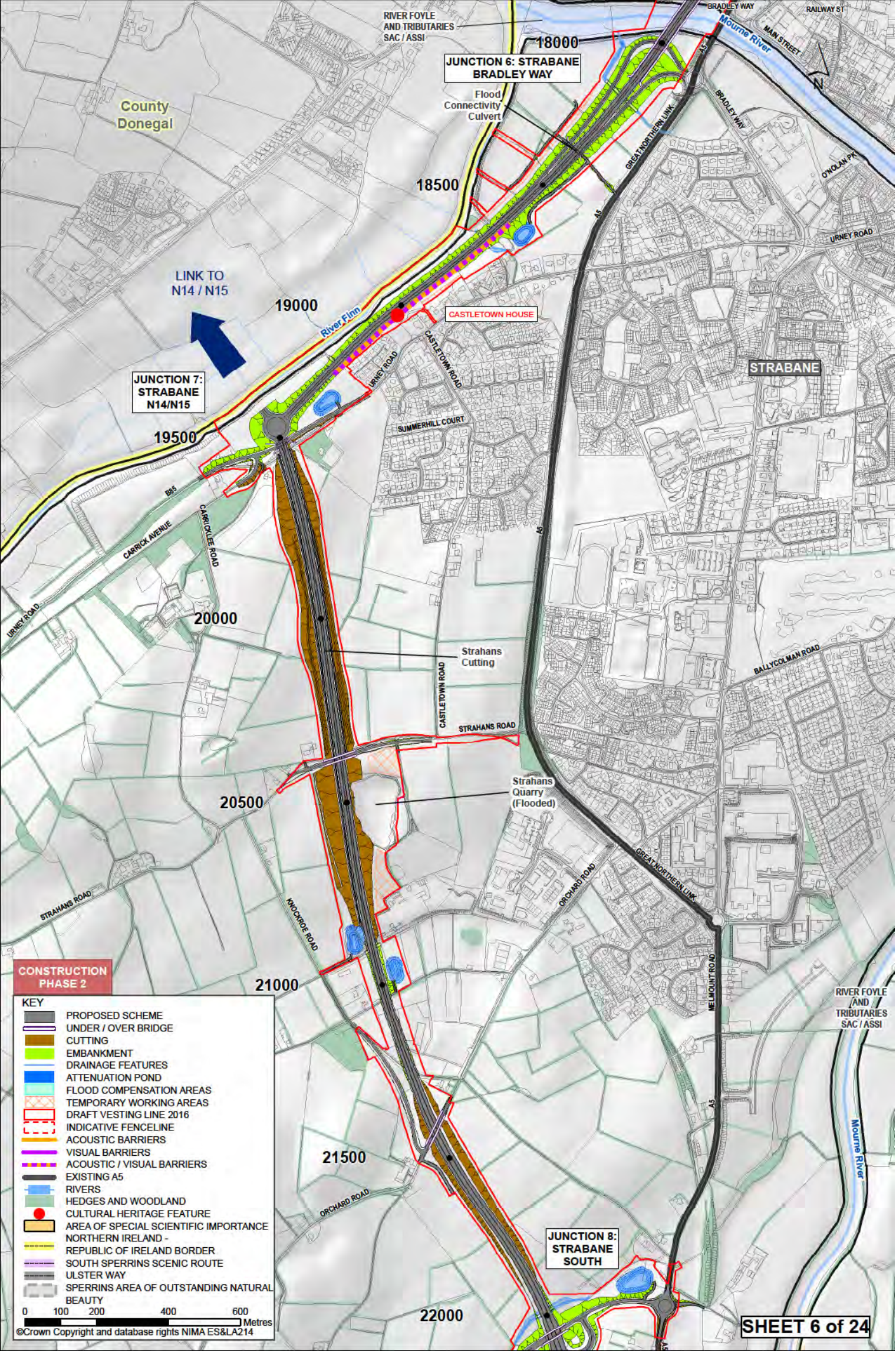
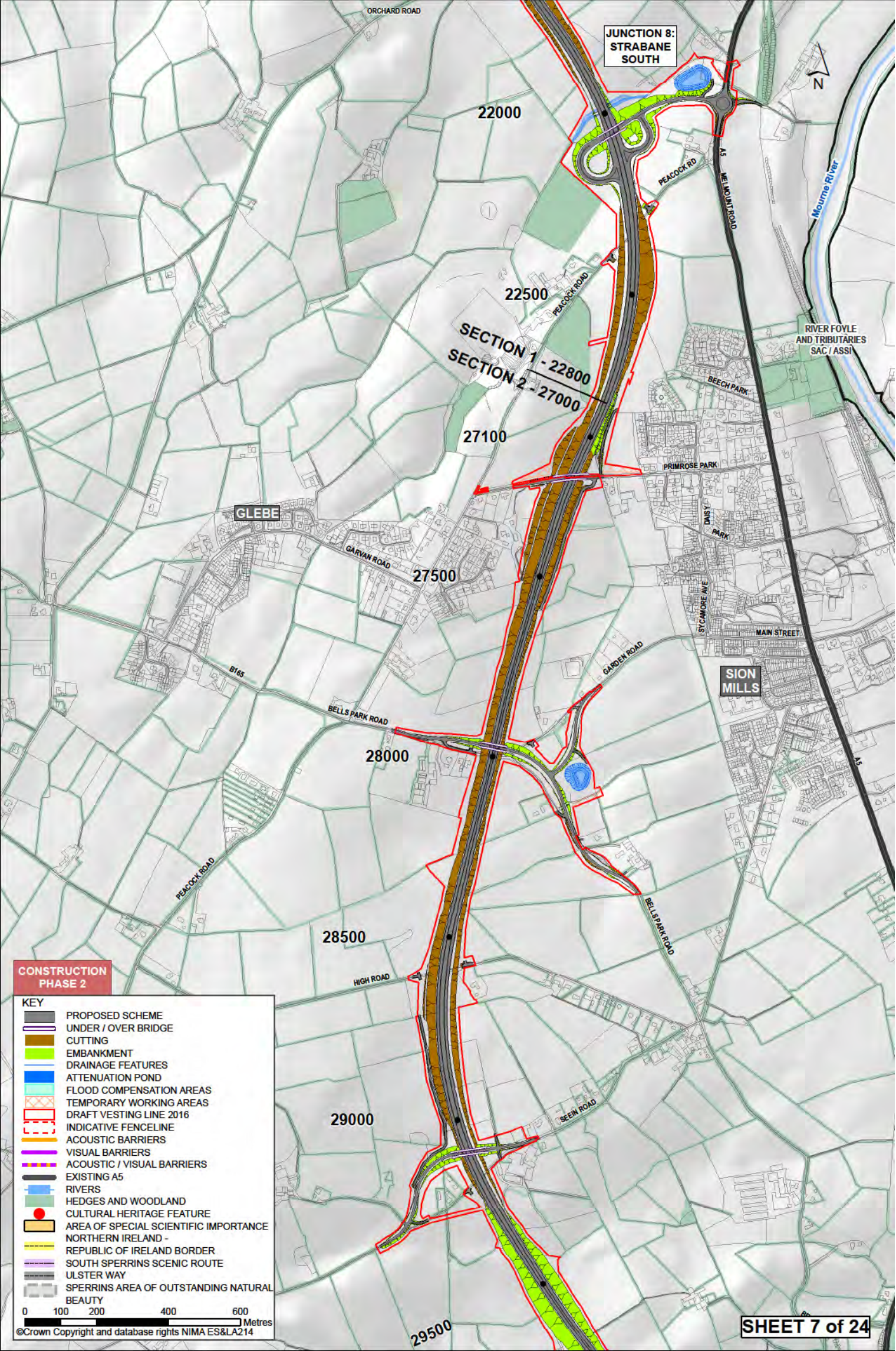
SHEET 5 of 24




ORCHARD ROAD
JUNCTION 8: STRABANE SOUTH
N
22000
PEACOCK RD
A5
NELMOUNT ROAD
Mourne River
22500
PEACOCK ROAD
SECTION 1 - 22800
SECTION 2 - 27000
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
BEECH PARK
27100
PRIMROSE PARK
GLEBE
DAISY PARK
GARVAN ROAD
27500
SYCAMORE AVE
MAIN STREET
B165
GARDEN ROAD
SION MILLS
BELLS PARK ROAD
28000
A5
PEACOCK ROAD
28500
BELLS PARK ROAD
HIGH ROAD
SEEIN ROAD
29000
29500
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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Metres
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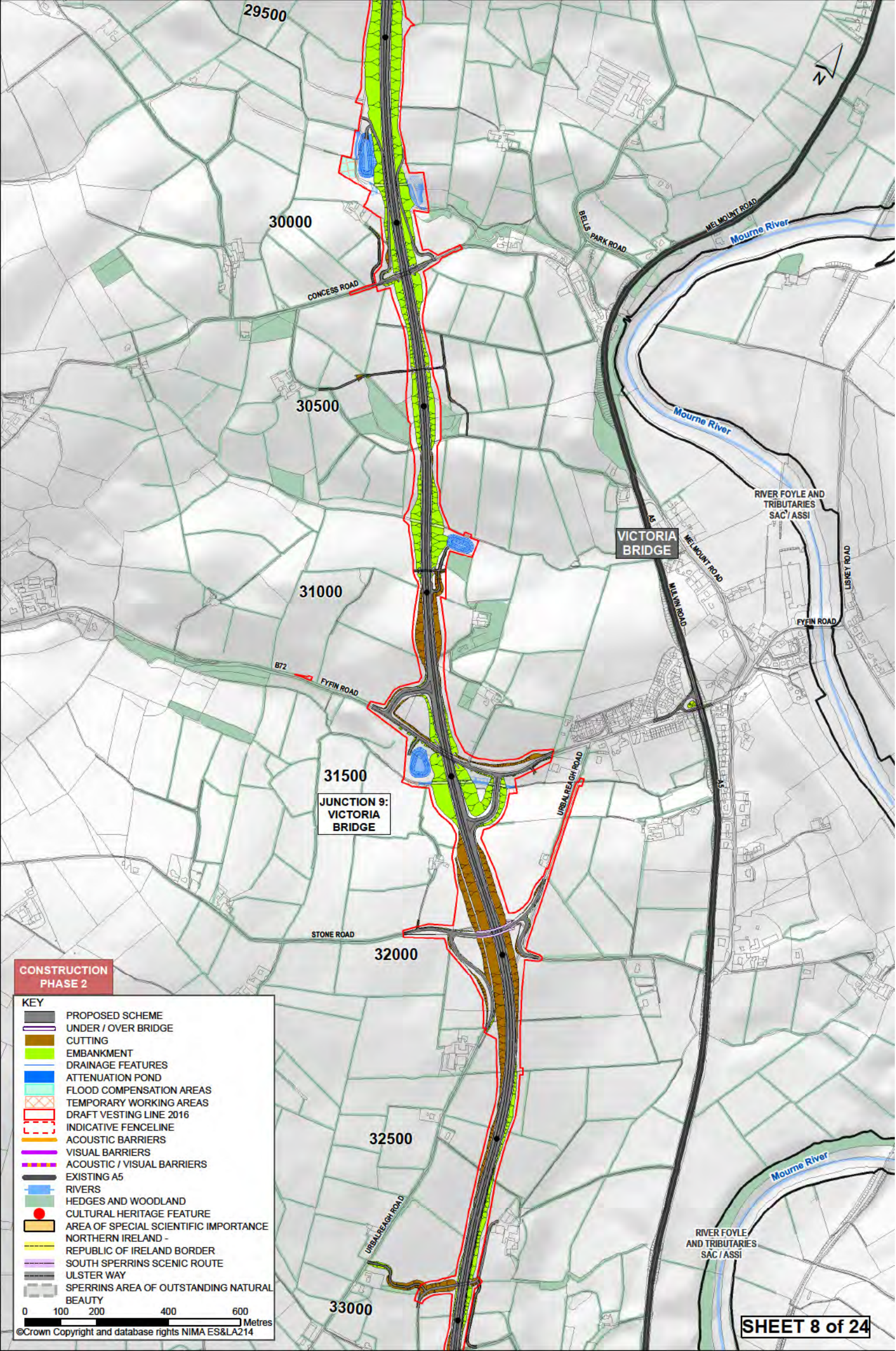
29500
30000
30500
31000
31500
32000
32500
33000
CONCESS ROAD
BELLS PARK ROAD
MELMOUNT ROAD
Mourne River
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
VICTORIA BRIDGE
A5
MELMOUNT ROAD
MILLVIN ROAD
LISKEY ROAD
FYFIN ROAD
B72
FYFIN ROAD
URBALREAGH ROAD
JUNCTION 9: VICTORIA BRIDGE
STONE ROAD
A5
URBALREAGH ROAD
Mourne River
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
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RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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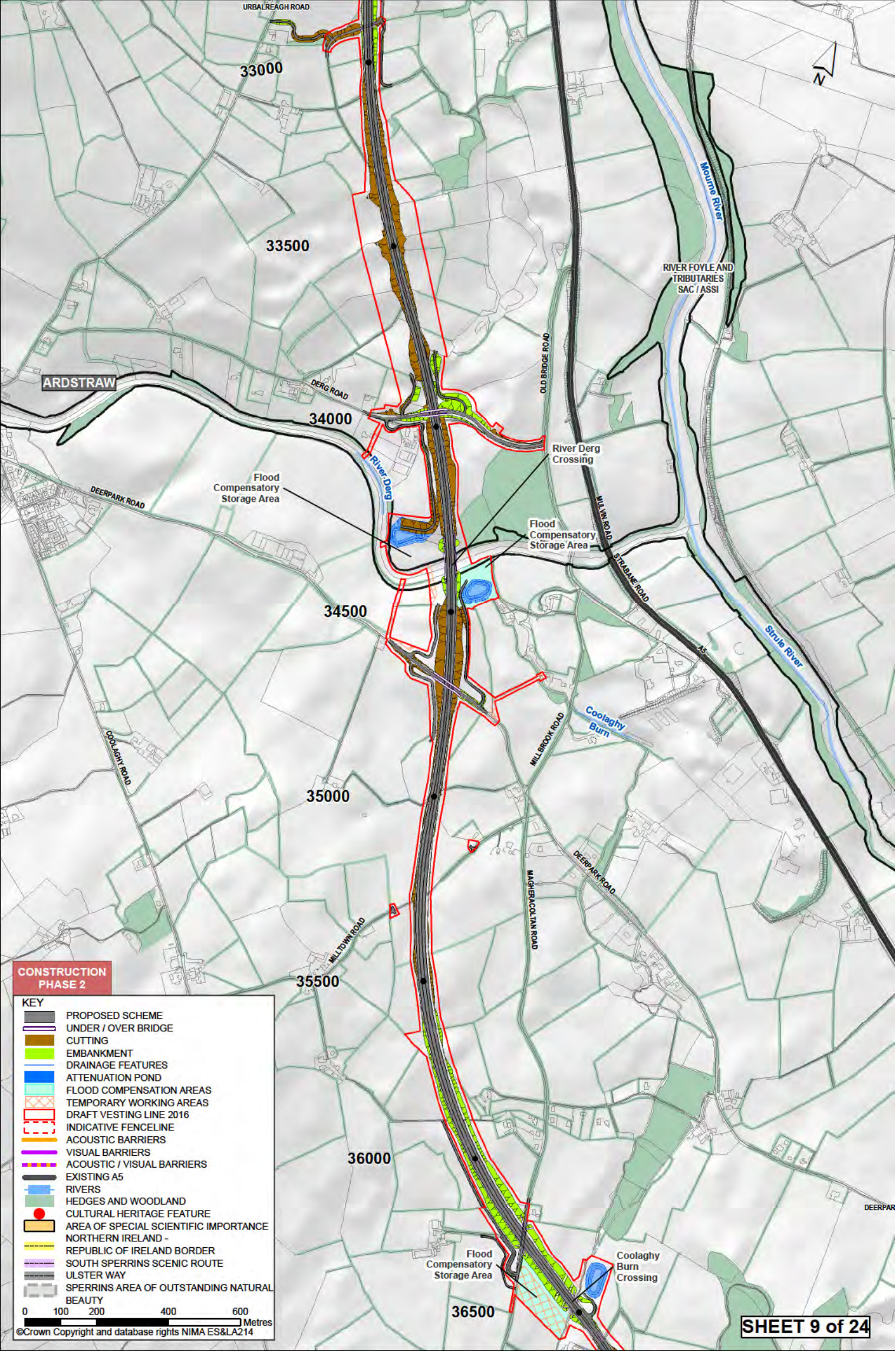
URBALREAGH ROAD
33000
33500
ARDSTRAW
DERG ROAD
34000
River Derg
River Derg Crossing
Flood Compensatory Storage Area
DEERPARK ROAD
OLD BRIDGE ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Moyle River
MILLVIN ROAD
STRABANE ROAD
A5
Strule River
Flood Compensatory Storage Area
34500
Coolaghy Burn
MILLBROOK ROAD
COOLAGHY ROAD
35000
DEERPARK ROAD
MAGHERACOLTAN ROAD
MILLTOWN ROAD
35500
36000
DEERPAR
Flood Compensatory Storage Area
Coolaghy Burn Crossing
36500
N
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
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HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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Metres
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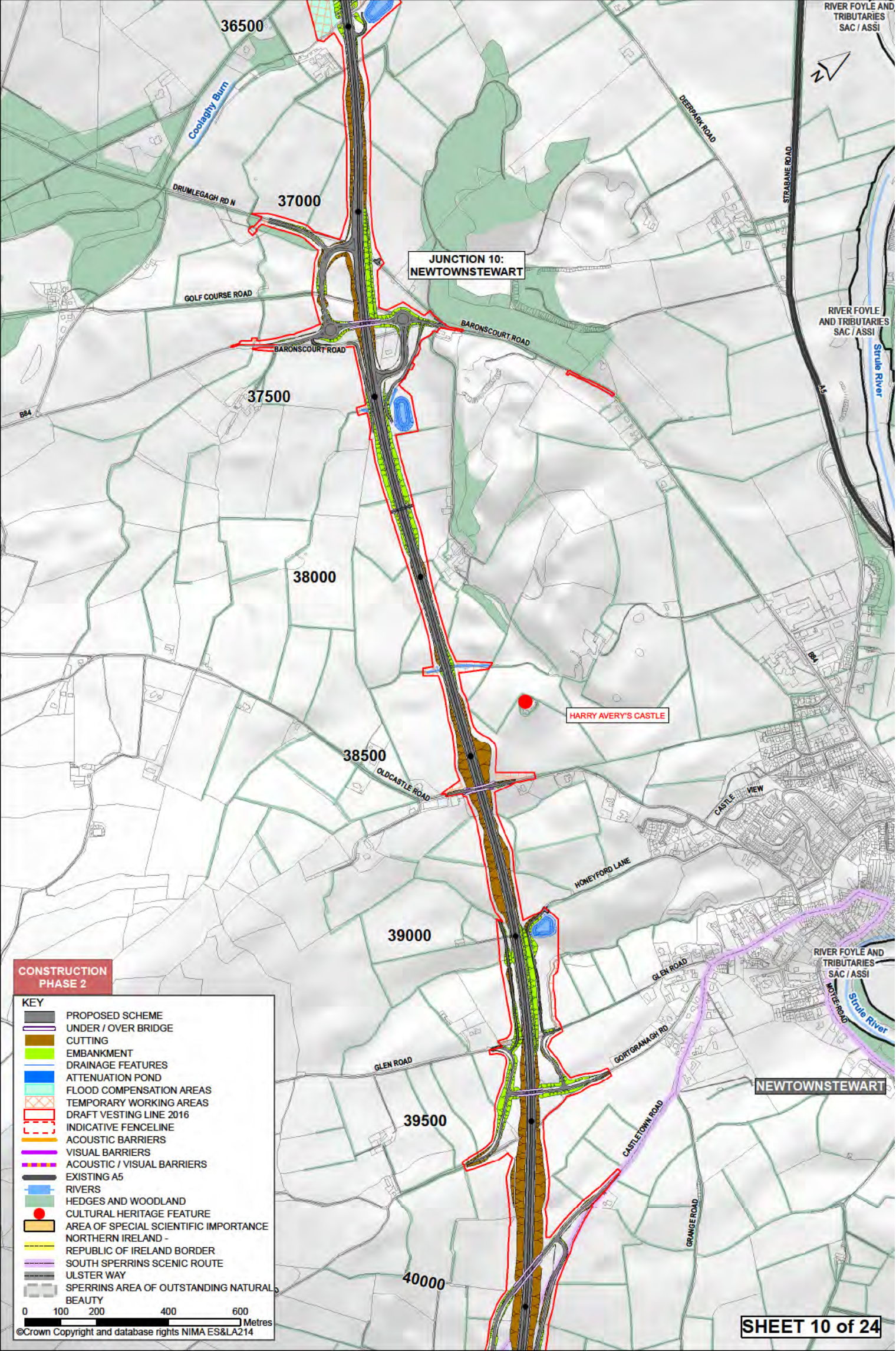
36500
37000
37500
38000
38500
39000
39500
40000
Coolaghy Burn
DRUMLEGAGH RD N
GOLF COURSE ROAD
BARONSCOURT ROAD
BARONSCOURT ROAD
B84
JUNCTION 10:
NEWTOWNSTEWART
DEERPARK ROAD
STRABANE ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
Strule River
A5
B84
HARRY AVERY'S CASTLE
OLDCASTLE ROAD
CASTLE VIEW
HONEYFORD LANE
GLEN ROAD
RIVER FOYLE AND TRIBUTARIES SAC / ASSI
MOYLE ROAD
Strule River
GORTGRANAGH RD
GLEN ROAD
NEWTOWNSTEWART
CASTLETOWN ROAD
GRANGE ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
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ULSTER WAY
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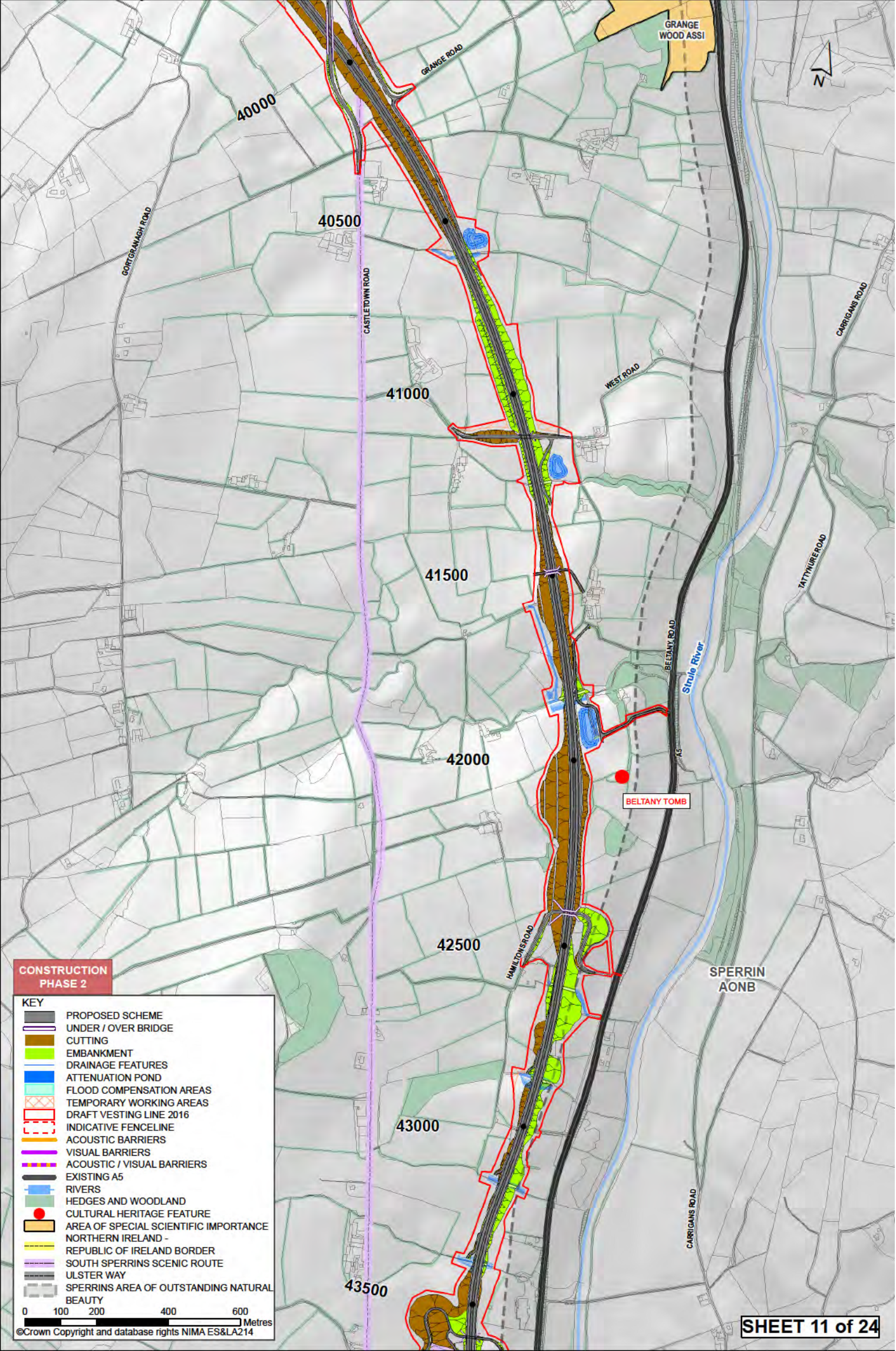
GRANGE WOOD ASSI
GRANGE ROAD
40000
40500
41000
41500
42000
42500
43000
43500
GORTGRANAGH ROAD
CASTLETOWN ROAD
WEST ROAD
CARRIGANS ROAD
TATTYHURE ROAD
BELTANY ROAD
Strule River
A5
BELTANY TOMB
HAMILTONSROAD
SPERRIN AONB
CARRIGANS ROAD
N
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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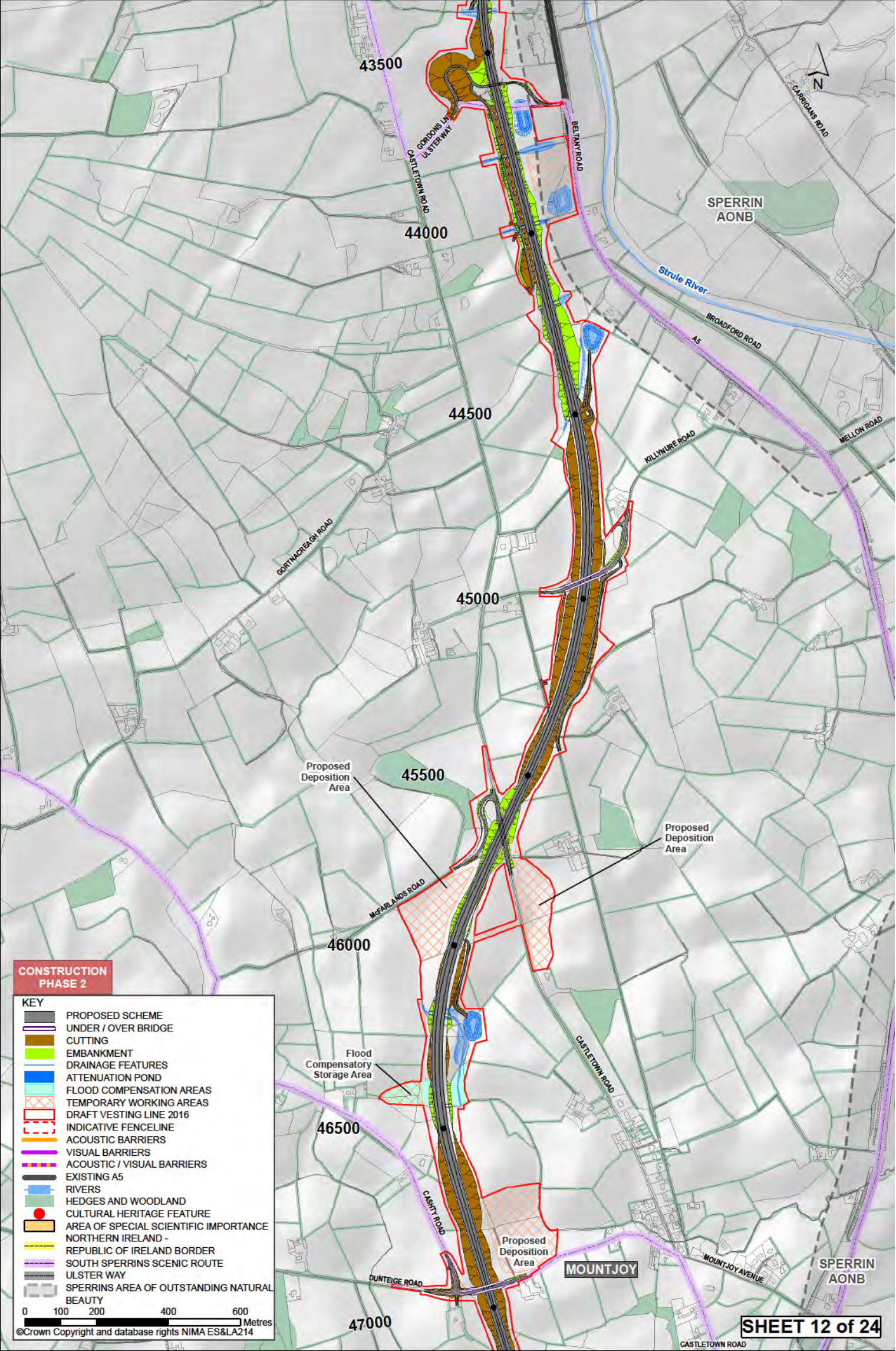
43500
44000
44500
45000
45500
46000
46500
47000
N
SPERRIN AONB
Strule River
BELTANY ROAD
CARRIGANS ROAD
GORDONS LN
ULSTERWAY
CASTLETOWN ROAD
BROADFORD ROAD
A5
KILLYNURE ROAD
MELLON ROAD
GORTNACREAGH ROAD
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
McFARLANDS ROAD
Flood Compensatory Storage Area
CASTLETOWN ROAD
CASHTY ROAD
DUNTEIGE ROAD
MOUNTJOY
MOUNTJOY AVENUE
SPERRIN AONB
CASTLETOWN ROAD
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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Metres
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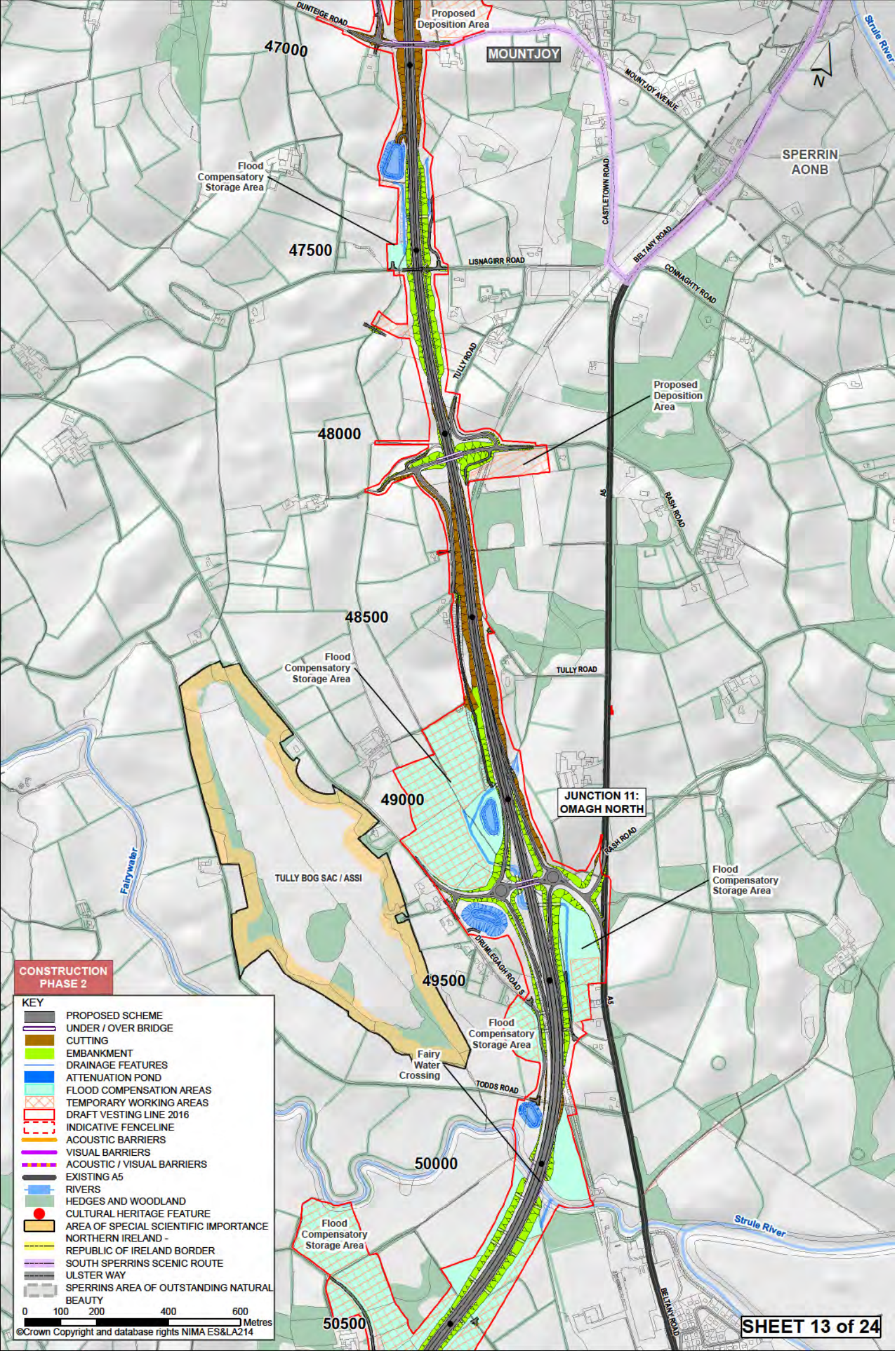
DUNTEIGE ROAD
Proposed Deposition Area
MOUNTJOY
MOUNTJOY AVENUE
Strule River
N
47000
Flood Compensatory Storage Area
SPERRIN AONB
CASTLETOWN ROAD
BELTANY ROAD
47500
LISNAGIRR ROAD
CONNAGHTY ROAD
TULLY ROAD
Proposed Deposition Area
48000
A5
RASH ROAD
48500
Flood Compensatory Storage Area
TULLY ROAD
JUNCTION 11: OMAGH NORTH
49000
RASH ROAD
Fairywater
TULLY BOG SAC / ASSI
Flood Compensatory Storage Area
DRUMLEGAGH ROAD S
49500
A5
Flood Compensatory Storage Area
Fairy Water Crossing
TODDS ROAD
50000
Flood Compensatory Storage Area
Strule River
BELTANY ROAD
50500
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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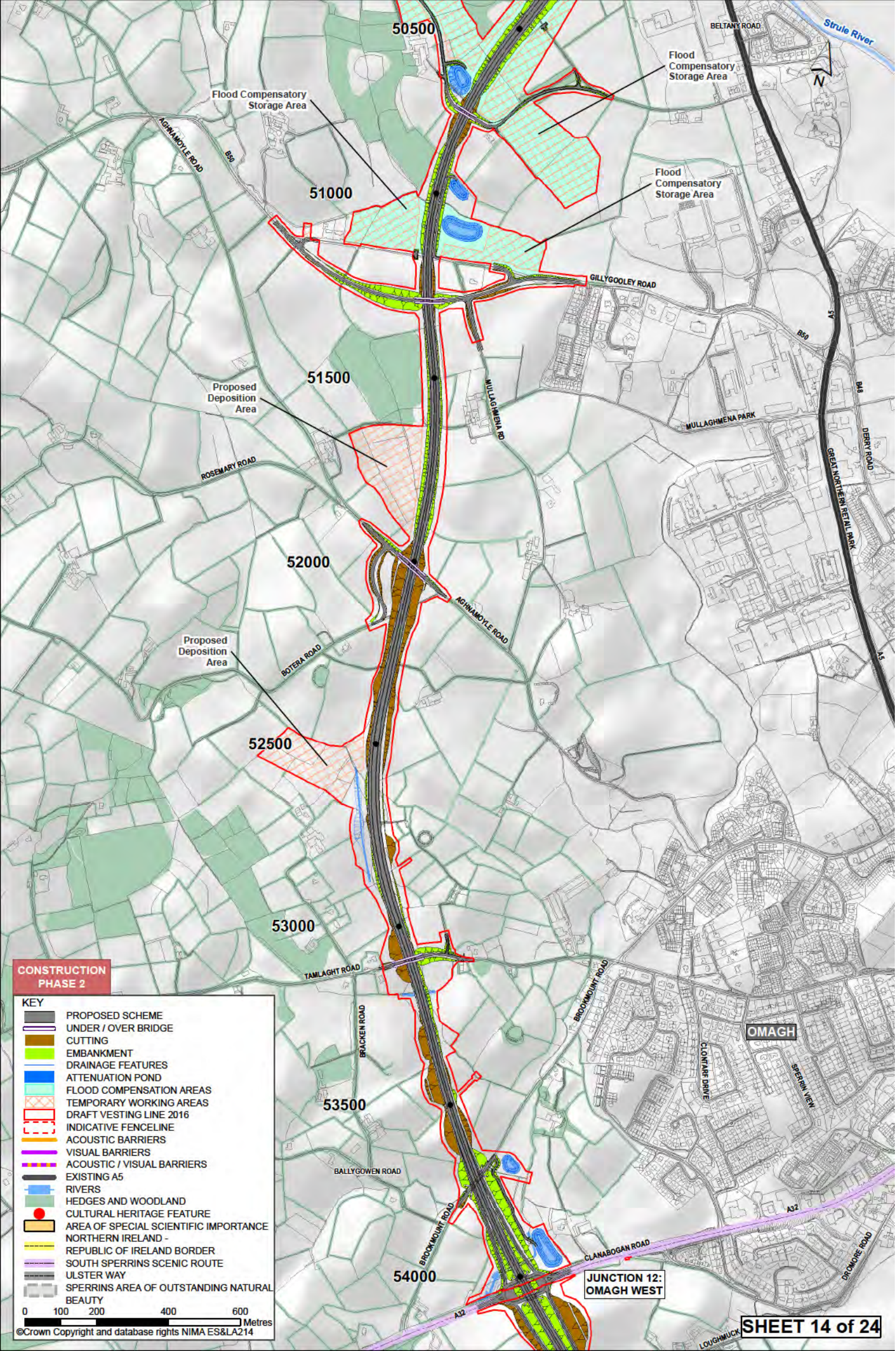
SHEET 13 of 24


50500
51000
51500
52000
52500
53000
53500
54000
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Proposed Deposition Area
Proposed Deposition Area
AGHNAMOYLE ROAD
B50
BELTANY ROAD
Strule River
N
GILLYGOOLEY ROAD
B50
A5
B48
MULLAGHMENA RD
MULLAGHMENA PARK
DERRY ROAD
GREAT NORTHERN RETAIL PARK
ROSEMARY ROAD
AGHNAMOYLE ROAD
BOTERA ROAD
TAMLAGHT ROAD
BRACKEN ROAD
BROOKMOUNT ROAD
OMAGH
CLONTARF DRIVE
SPERRIN VIEW
BALLYGOWEN ROAD
BROOKMOUNT ROAD
A32
CLANABOGAN ROAD
DROMORE ROAD
JUNCTION 12: OMAGH WEST
A32
LOUGHMUCK
CONSTRUCTION PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600
Metres
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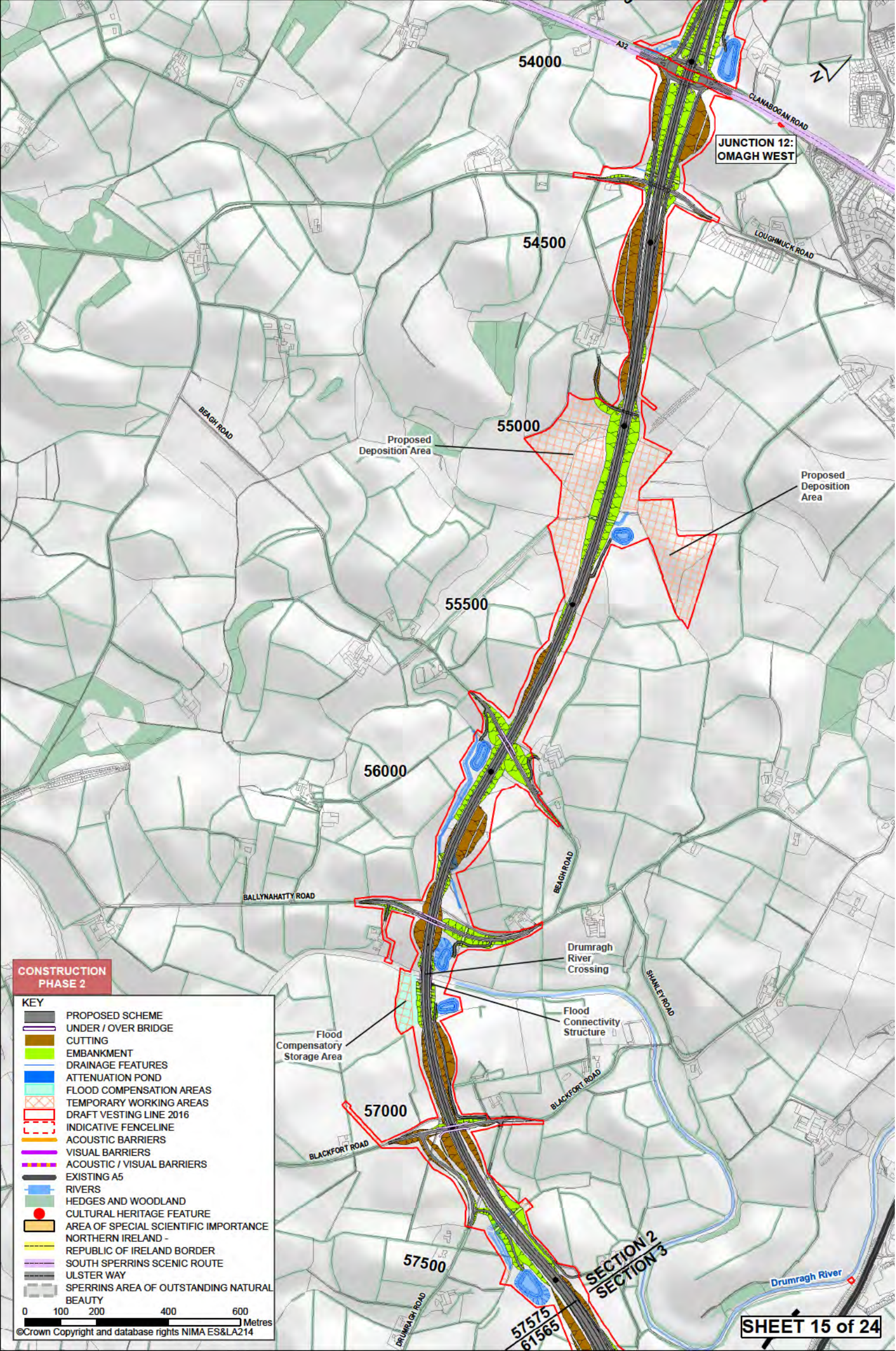
54000
54500
55000
55500
56000
57000
57500
A32
CLANABOGAN ROAD
JUNCTION 12:
OMAGH WEST
LOUGHMUCK ROAD
BEAGH ROAD
Proposed
Deposition Area
Proposed
Deposition
Area
BALLYNAHATTY ROAD
BEAGH ROAD
Drumragh
River
Crossing
SHANLEY ROAD
Flood
Connectivity
Structure
Flood
Compensatory
Storage Area
BLACKFORT ROAD
BLACKFORT ROAD
SECTION 2
SECTION 3
Drumragh River
DRUMRAGH ROAD
57575
61565
CONSTRUCTION
PHASE 2
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL
BEAUTY
0 100 200 400 600
Metres
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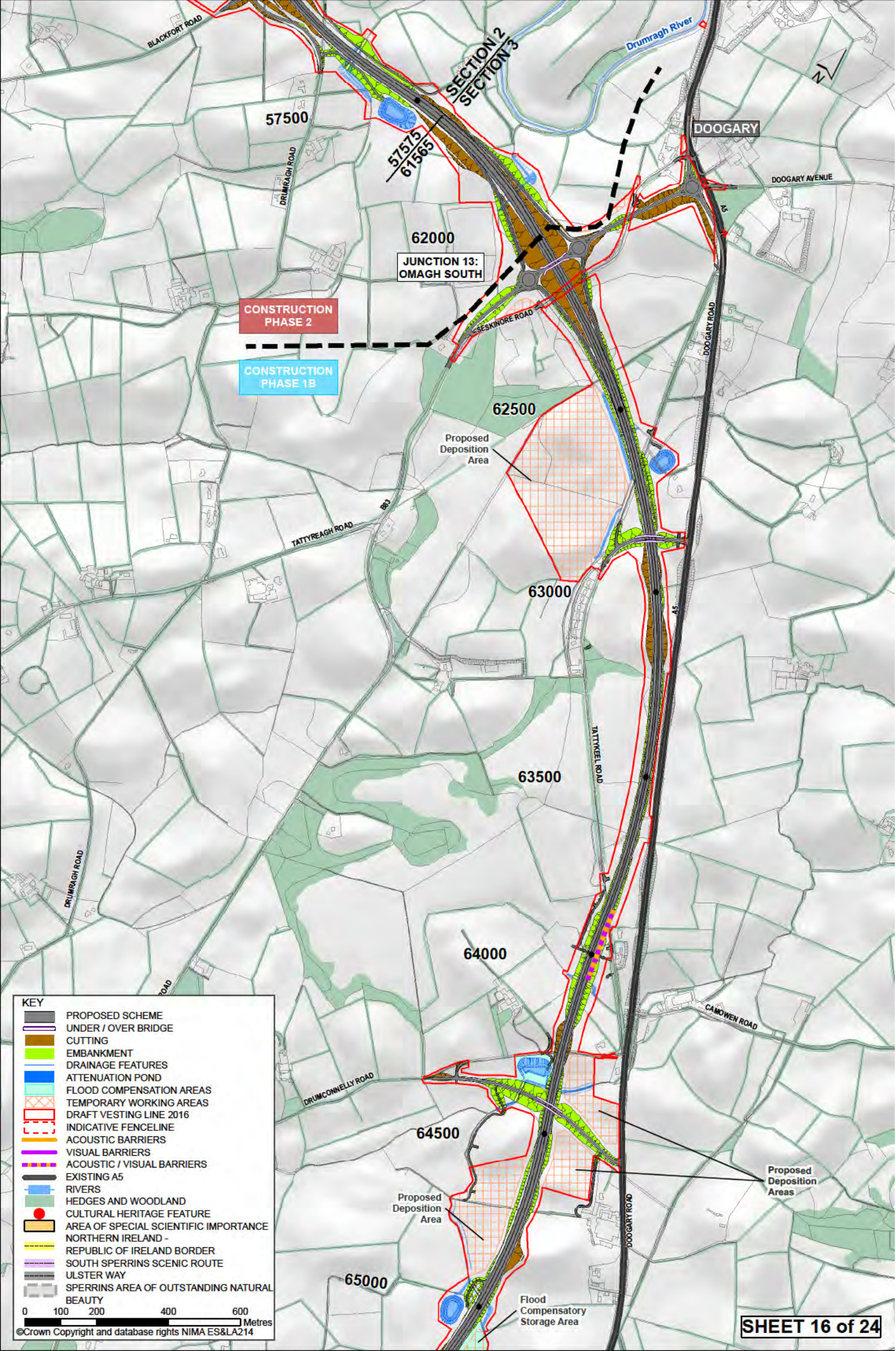
BLACKFORT ROAD
Drumragh River
SECTION 2
SECTION 3
57500
57575
61565
DRUMRAGH ROAD
DOOGARY
DOOGARY AVENUE
62000
JUNCTION 13:
OMAGH SOUTH
CONSTRUCTION
PHASE 2
CONSTRUCTION
PHASE 1B
SESKINORE ROAD
DOOGARY ROAD
62500
Proposed
Deposition
Area
TATTYREAGH ROAD
B83
63000
A5
TATTYKEEL ROAD
63500
DRUMRAGH ROAD
64000
CAMOWEN ROAD
DRUMCONNELLY ROAD
64500
Proposed
Deposition
Areas
Proposed
Deposition
Area
DOOGARY ROAD
65000
Flood
Compensatory
Storage Area
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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SPERRINS AREA OF OUTSTANDING NATURAL
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0 100 200 400 600
Metres
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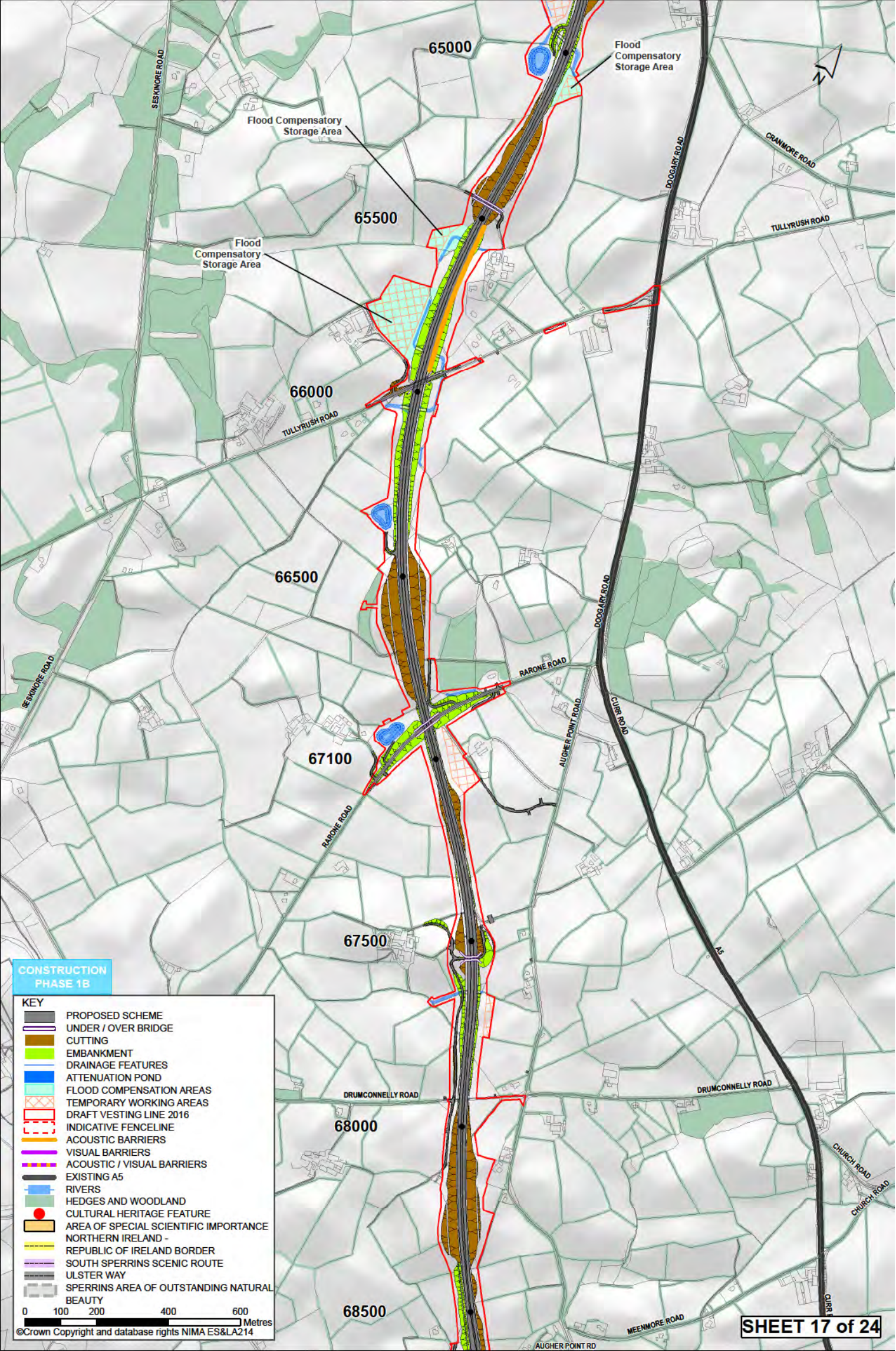
65000
65500
66000
66500
67100
67500
68000
68500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
Flood Compensatory Storage Area
SESKINORE ROAD
SESKINORE ROAD
TULLYRUSH ROAD
TULLYRUSH ROAD
CRANMORE ROAD
DOOGARY ROAD
DOOGARY ROAD
RARONE ROAD
RARONE ROAD
AUGHER POINT ROAD
CURR ROAD
A5
DRUMCONNELLY ROAD
DRUMCONNELLY ROAD
CHURCH ROAD
CHURCH ROAD
MEENMORE ROAD
AUGHER POINT RD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
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SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
0 100 200 400 600 Metres
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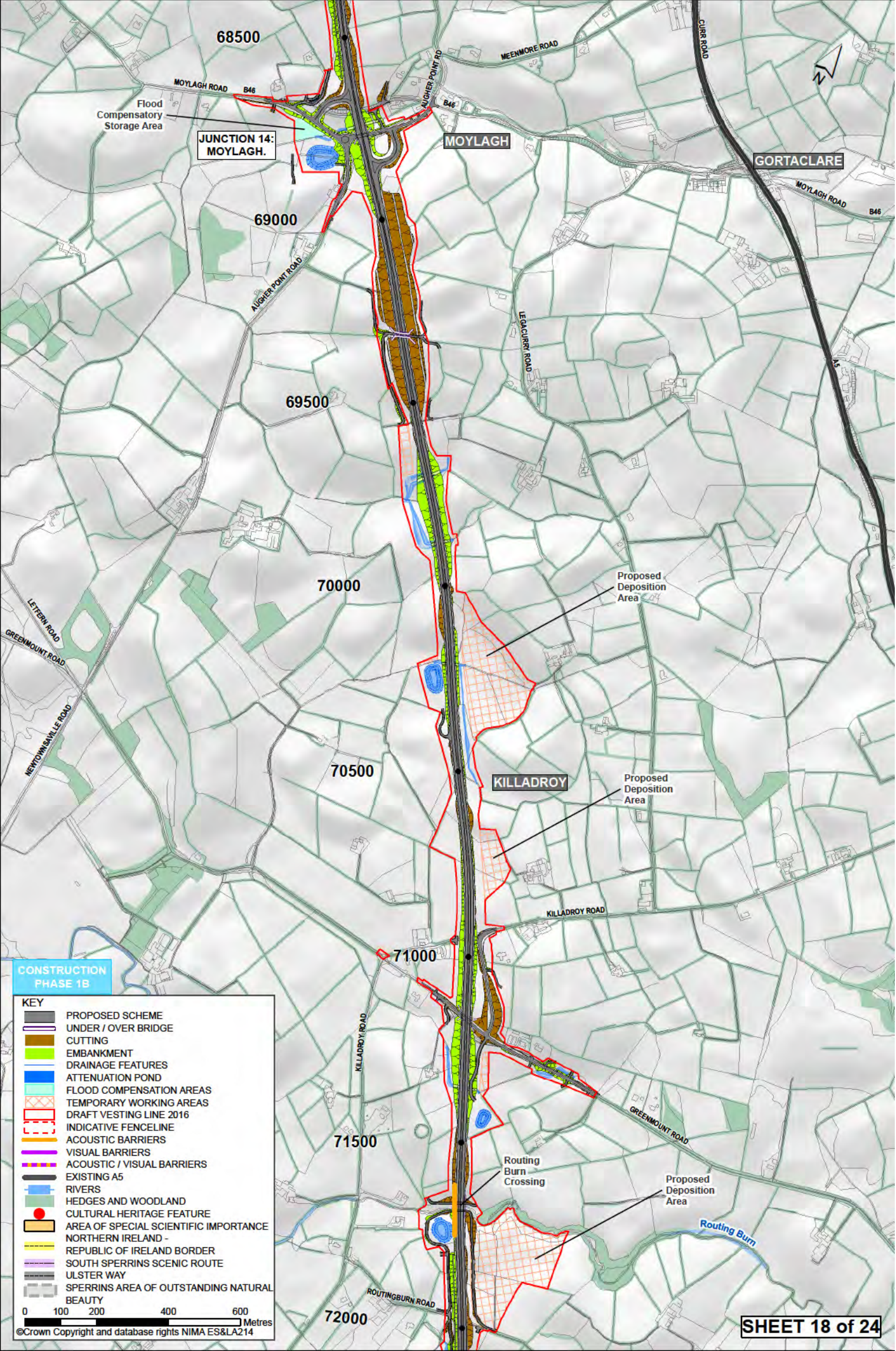

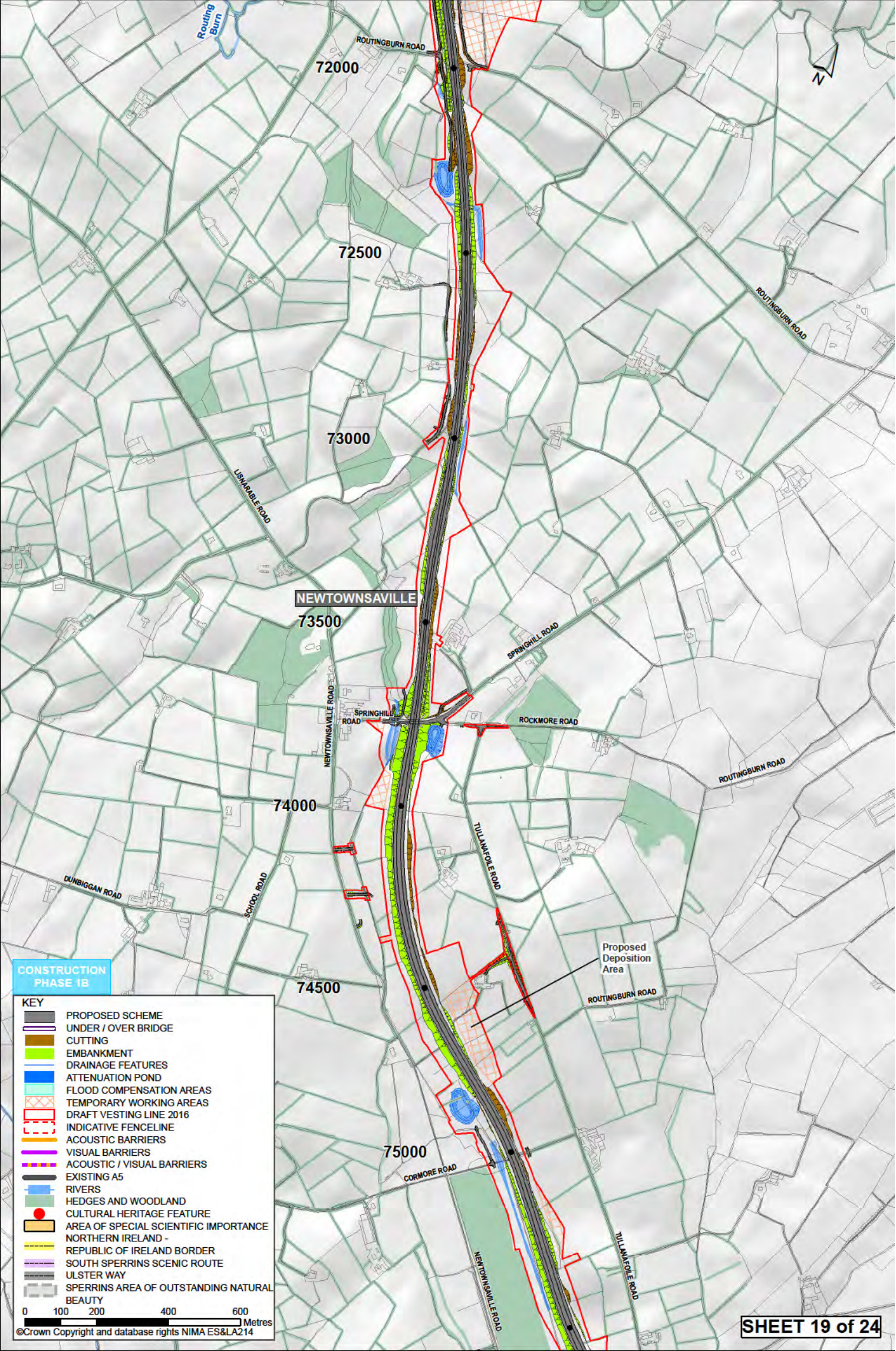
Routing Burn
ROUTINGBURN ROAD
72000
72500
73000
73500
74000
74500
75000
N
LISNARABLE ROAD
NEWTOWNSAVILLE
SPRINGHILL ROAD
NEWTOWNSAVILLE ROAD
SPRINGHILL ROAD
ROCKMORE ROAD
ROUTINGBURN ROAD
TULLANAFOILE ROAD
DUNBIGGAN ROAD
SCHOOL ROAD
Proposed Deposition Area
ROUTINGBURN ROAD
CORMORE ROAD
NEWTOWNSAVILLE ROAD
TULLANAFOILE ROAD
CONSTRUCTION PHASE 1B
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
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VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE NORTHERN IRELAND -
REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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Metres
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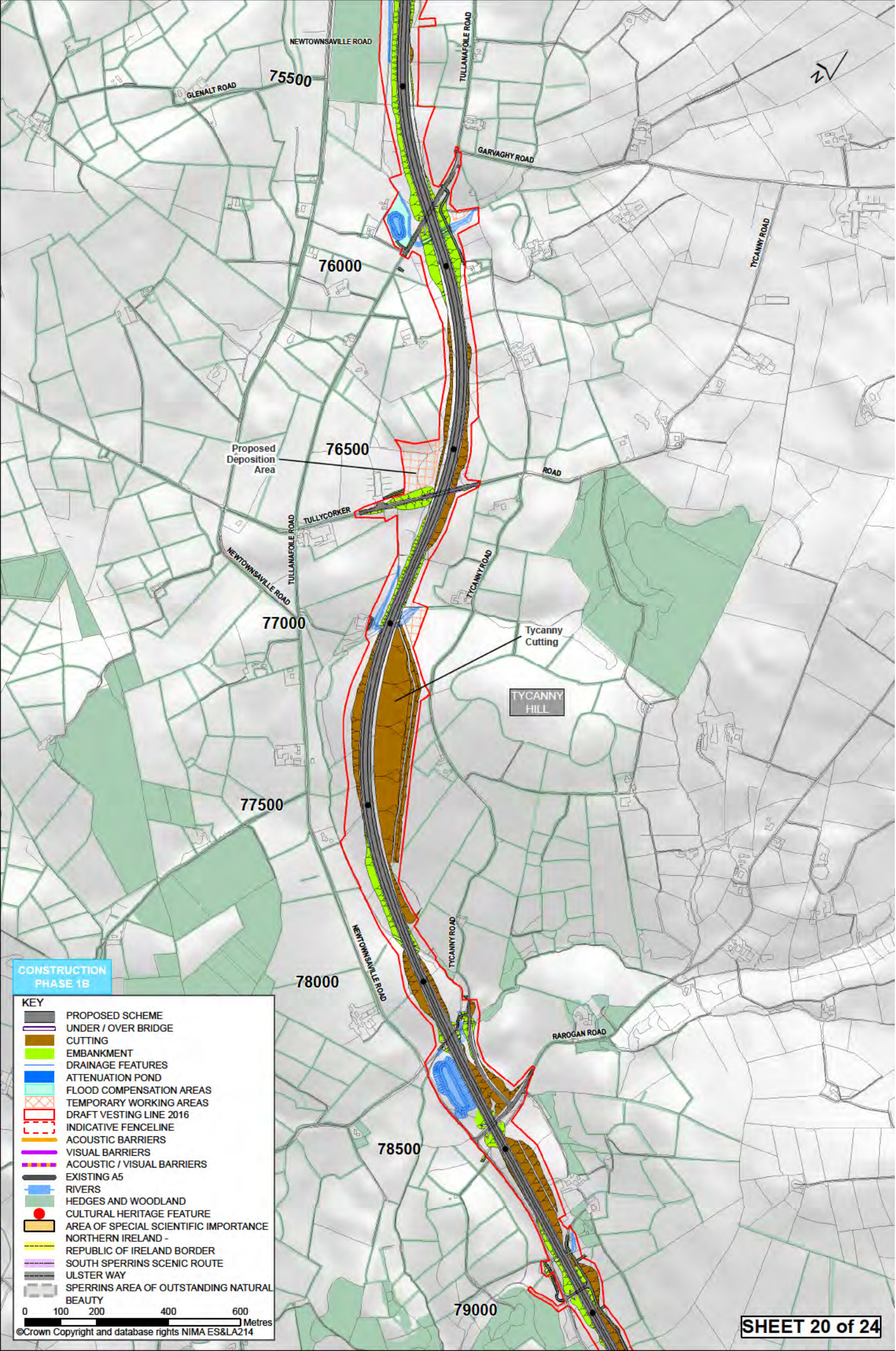
SHEET 19 of 24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GLENALT ROAD
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TULLANAFOILE ROAD
GARVAGHY ROAD
TYCANNY ROAD
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Proposed Deposition Area
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ROAD
TULLYCORKER
TULLANAFOILE ROAD
NEWTOWNSAVILLE ROAD
TYCANNY ROAD
77000
Tycanny Cutting
TYCANNY HILL
77500
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RAROGAN ROAD
78500
79000
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KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
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CULTURAL HERITAGE FEATURE
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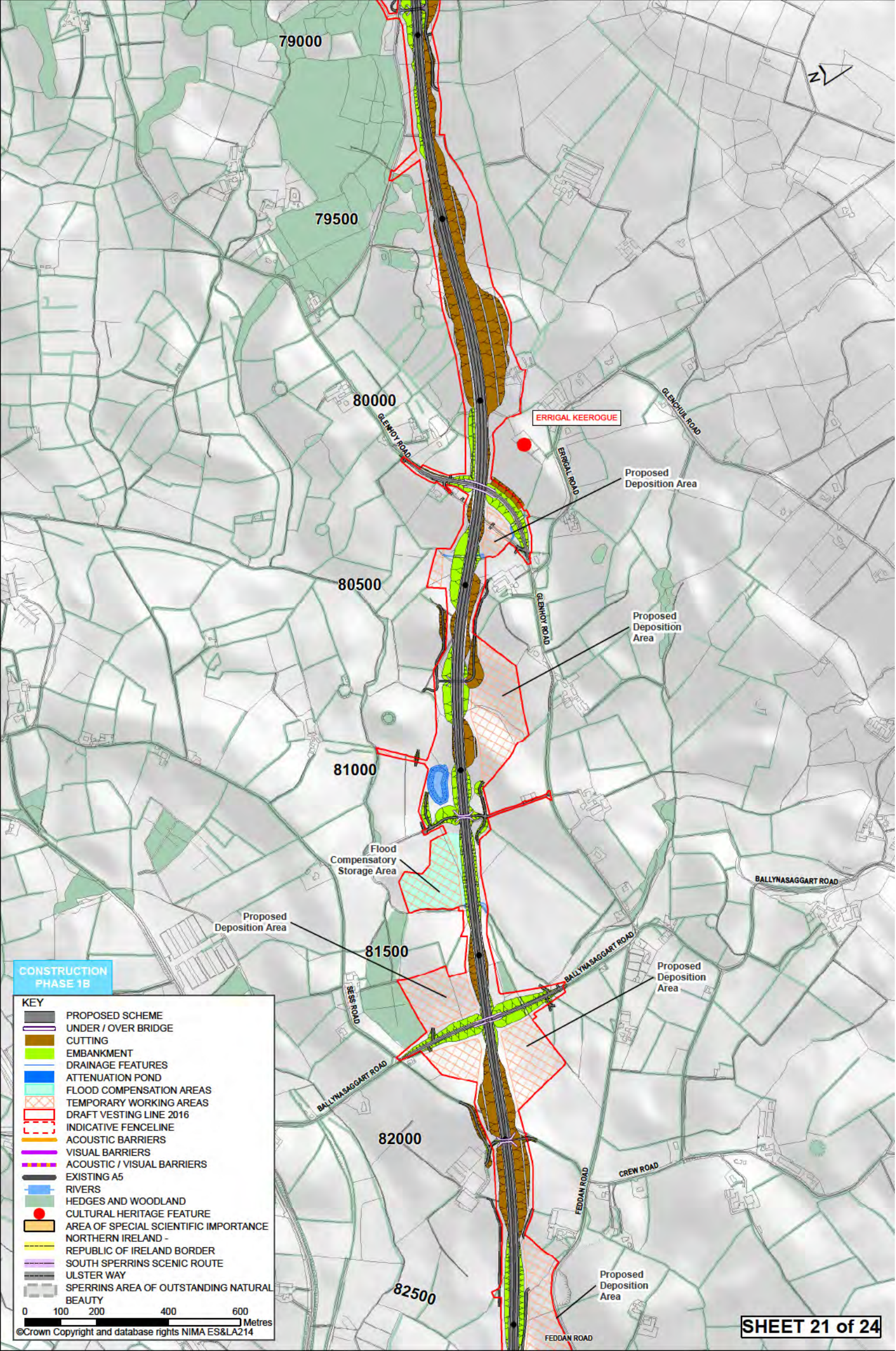
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80000
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82500
N
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ERRIGAL ROAD
GLENCHUIL ROAD
GLENHOY ROAD
Proposed Deposition Area
Proposed Deposition Area
Flood Compensatory Storage Area
Proposed Deposition Area
Proposed Deposition Area
Proposed Deposition Area
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
BALLYNASAGGART ROAD
SESS ROAD
CREW ROAD
FEDDAN ROAD
FEDDAN ROAD
CONSTRUCTION PHASE 1B
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PROPOSED SCHEME
UNDER / OVER BRIDGE
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EMBANKMENT
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ATTENUATION POND
FLOOD COMPENSATION AREAS
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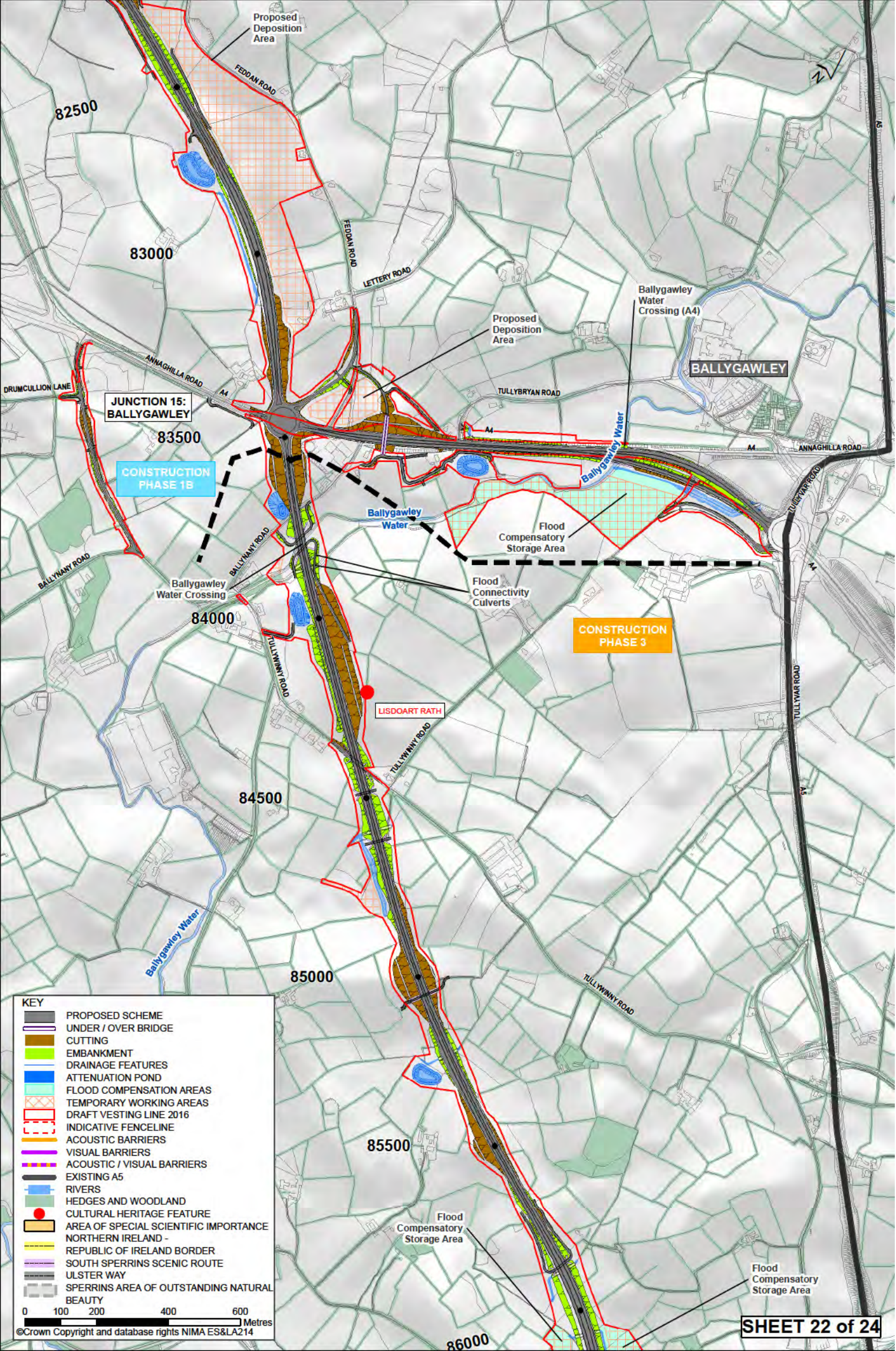
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82500
83000
LETTERY ROAD
Ballygawley Water Crossing (A4)
Proposed Deposition Area
BALLYGAWLEY
ANNAGHILLA ROAD
A4
DRUMCULLION LANE
JUNCTION 15: BALLYGAWLEY
TULLYBRYAN ROAD
83500
CONSTRUCTION PHASE 1B
Ballygawley Water
ANNAGHILLA ROAD
TULLYVAR ROAD
Flood Compensatory Storage Area
BALLYNANY ROAD
Ballygawley Water Crossing
Flood Connectivity Culverts
84000
CONSTRUCTION PHASE 3
TULLYWINNY ROAD
LISDOART RATH
84500
A5
85000
85500
Flood Compensatory Storage Area
Flood Compensatory Storage Area
86000
N
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
INDICATIVE FENCELINE
ACOUSTIC BARRIERS
VISUAL BARRIERS
ACOUSTIC / VISUAL BARRIERS
EXISTING A5
RIVERS
HEDGES AND WOODLAND
CULTURAL HERITAGE FEATURE
AREA OF SPECIAL SCIENTIFIC IMPORTANCE
NORTHERN IRELAND - REPUBLIC OF IRELAND BORDER
SOUTH SPERRINS SCENIC ROUTE
ULSTER WAY
SPERRINS AREA OF OUTSTANDING NATURAL BEAUTY
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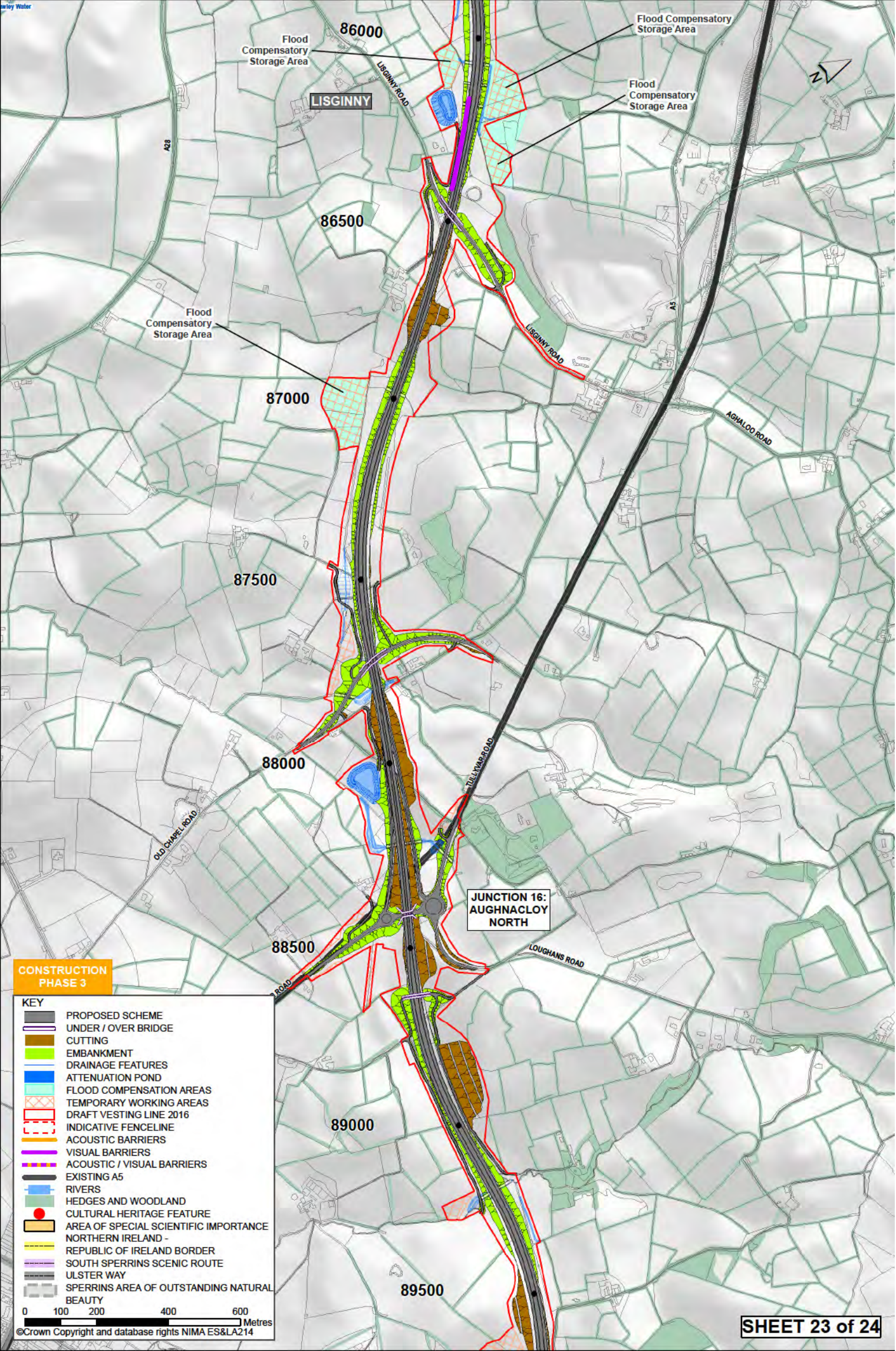
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Flood Compensatory Storage Area
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Flood Compensatory Storage Area
LISGINNY
LISGINNY ROAD
A28
A5
86000
86500
87000
87500
88000
88500
89000
89500
AGHALOO ROAD
TULLYVARRAN ROAD
OLD CHAPEL ROAD
LOUGHANS ROAD
JUNCTION 16: AUGHNACLOY NORTH
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
DRAFT VESTING LINE 2016
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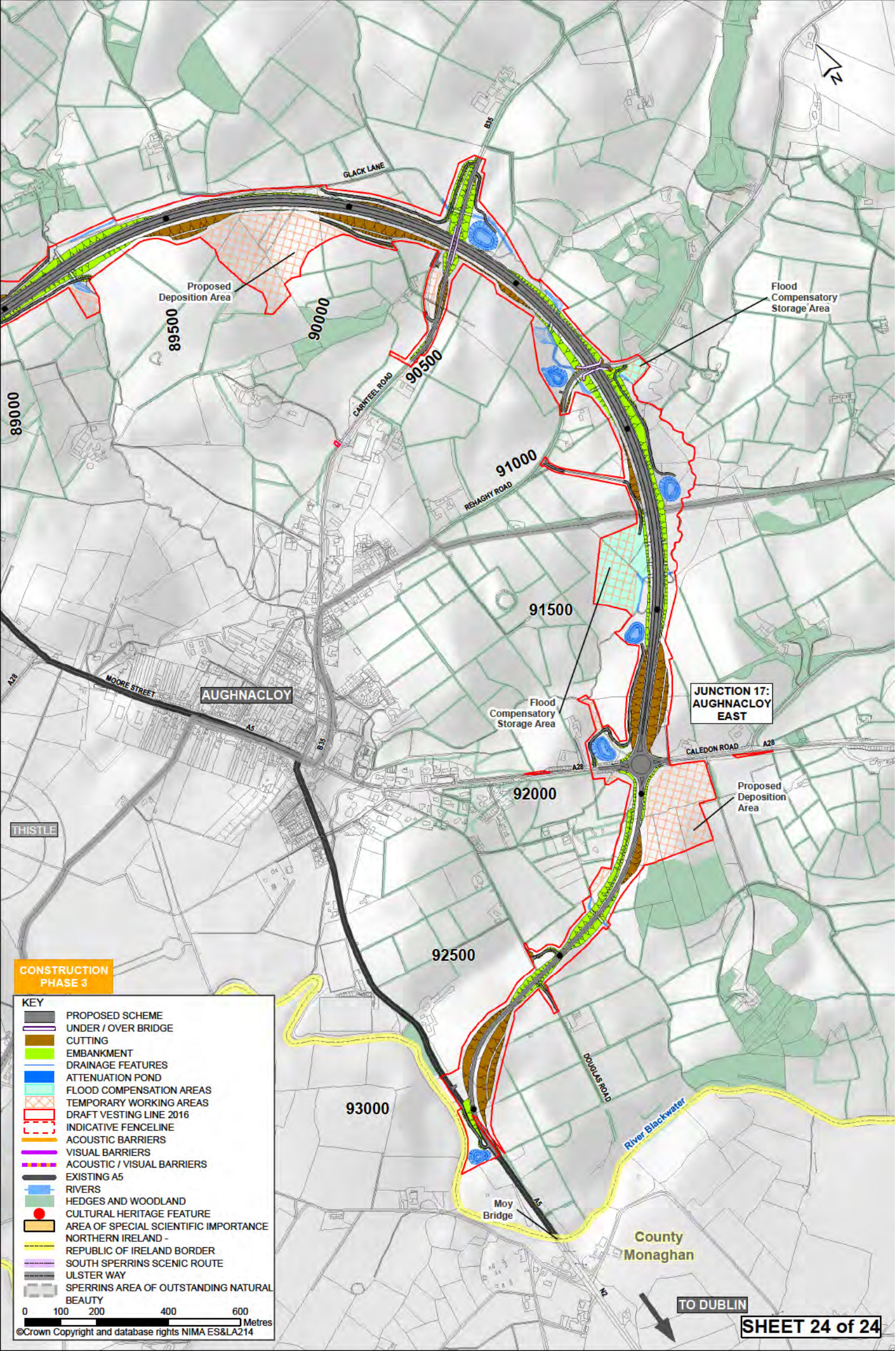
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90500
89000
CARNTEEL ROAD
Flood Compensatory Storage Area
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REHAGHY ROAD
91500
AUGHNACLOY
MOORE STREET
A28
A5
B35
Flood Compensatory Storage Area
JUNCTION 17: AUGHNACLOY EAST
CALEDON ROAD
A28
A28
92000
Proposed Deposition Area
THISTLE
92500
DOUGLAS ROAD
River Blackwater
93000
Moy Bridge
A5
County Monaghan
N2
TO DUBLIN
CONSTRUCTION PHASE 3
KEY
PROPOSED SCHEME
UNDER / OVER BRIDGE
CUTTING
EMBANKMENT
DRAINAGE FEATURES
ATTENUATION POND
FLOOD COMPENSATION AREAS
TEMPORARY WORKING AREAS
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ULSTER WAY
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Appendix 2: Mouchel Report on Re-design of Works near Tully Bog SAC

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Tully Bog SAC Report

1st June 2016

Prepared by

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Report Date	June 2016

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Version	Status	Author	Date	Checked by	Date	Approved by	Date
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Distribution

Date	Organisation	Contact	Format	Copies
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July 2016	NIEA	K.Finnegan	PDF	1

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Contents

1 Introduction

1.1 Background to the Scheme

Mouchel has been commissioned by TransportNI (TNI and formerly Roads Service) as client advisor for the proposed A5 Western Transport Corridor (A5 WTC) scheme. The A5 forms part of a strategically important transport route between Londonderry in Northern Ireland (NI) and Dublin in the Republic of Ireland (ROI). The Proposed Scheme will involve the construction of an 86km dual carriageway running between the southern limit of New Buildings and the border with the Republic of Ireland (ROI) immediately south of Aughnacloy. The scheme is being developed and assessed in accordance with the Design Manual for Roads and Bridges (DMRB) and regional guidelines.

1.2 DMRB

Volume 11 of the DMRB relates to the 3 stage assessment process to carry out the Environmental Assessment for the proposed scheme. This process has identified a large number of constraints to be considered and avoided, if possible, by the Proposed Scheme. This included nationally and internationally designated sites, of which Tully Bog Special Area of Conservation (SAC) is one.

1.3 Habitats Regulations

In January 2011, in compliance with the Habitats Regulations, 4 no Habitats Regulations Assessment (HRA) Screening Reports were submitted to the statutory consultees for comment. This included a Report on the Tully Bog SAC and the NIEA responded stating that they were satisfied with the findings of all the Reports.

1.4 High Court Challenge

A High Court challenge to the making of the Orders was submitted in 2012, and the Judge, in making his decision, took into account more recent judgements regarding the Habitats Regulations Assessment process as well as the submission made by the Loughs Agency to the Inspectors at the Public Inquiries (May/June 2011). The judgement made was that an Appropriate Assessment under the Habitats Directive should have been carried out in relation to the River Foyle and Tributaries SAC and as no Appropriate Assessment had been made, the Judge quashed the Orders.

1.5 Appropriate Assessment

Rather than challenge the decision, TNI decided to remedy the situation and have prepared 4 No Reports to Inform an Appropriate Assessment for each category of designation (watercourse SACs, Ramsar Sites, Special Protection Areas (SPAs) and Tully Bog SAC). These reports were published in 2014 for consultation and NIEA were a respondent to all 4 reports. Their response to the Tully Bog SAC Report raised the risk associated with recent research into potential geological links between raised bogs and ground water. Whilst still unpublished research, TNI have adopted a precautionary approach to the HRAs and in this instance instructed Mouchel to review the scheme proposals in the vicinity of the Tully Bog. This report presents the findings of this review and the proposed localised changes to the scheme design which also incorporates other required design changes.

2 History

2.1 Introduction

The route assessment process always identified the Tully Bog SAC as a major constraint and as such the selection of the Preferred Route in 2009 located the proposed dual carriageway to the east of and downstream from the Tully Bog and associated watercourses. During the development of the scheme since 2009, the proposed road has not deviated from the selected line in the vicinity of Tully Bog.

2.2 Location

Tully Bog is designated as an SAC due to the presence of active raised bog (an Annex 1 Habitat) within the site. Surface levels within the SAC range between 62m AOD at the east end to 68m AOD on the north side alongside Drumlegagh Road South.

2.3 Proposed Scheme

The Proposed Scheme passes to the east of the Tully Bog SAC with the dual carriageway being approximately 200m from the Bog at it nearest point and is also downstream of the natural watercourse network (Tully Drain and Fairy Water) in the vicinity of the Bog.

2.4 Ancillary Works

There are major ancillary works in this area associated with the provision of a grade separated junction (Junction 11), side road realignments (Drumlegagh Road South), SUDS drainage systems, watercourse diversions (Tully Drain) and flood plain compensatory storage area associated with the Tully Drain.

2.5 Existing Structures

The NIEA response to the consultation on the Report to Inform the Appropriate Assessment of Tully Bog SAC has indicated that emerging research is identifying that raised bogs (such as Tully Bog) can be affected by changes in groundwater regime – this research was not published at the time of the meeting. This is counter to previous knowledge and understanding that raised bogs were largely fed by rainwater.

3 Design Review

3.1 Embankments

The natural low lying nature of the ground to the east and south of Tully Bog means that the majority of the proposed works are on embankments of varying heights above predicted flood levels of the various watercourses. The only exceptions to this being the watercourse diversion works and the flood compensatory storage areas.

3.2 2010 Proposed Design

In the 2010 proposed design (see drawing No 718736-S2-0800-1484), these latter works required the lowering of the ground level by up to 5m to create replacement floodplain as close as possible to the areas of existing floodplain lost to the road embankments. The proposals included for the vesting of land right up to the edge of Drumlegagh Road South for the proposed floodplain and the western edge of this flood compensatory storage area came within 30m horizontally of the SAC boundary and would be 5m lower than the surface level of the Bog at a level of 63m AOD (approximate).

3.3 Groundwater Data

A review of the available ground water data in this location has indicated that there is insufficient data relating to groundwater levels and flow paths in and around the Bog to determine with scientific certainty that the groundwater regime would not be affected by the 2010 proposed excavation for the flood storage areas.

3.4 Alternative Design

An alternative design for the flood compensatory storage areas has been assessed and prepared which moves the proposed flood compensatory storage areas away from the Bog but requires replacement/additional land from 2 landowners who are already in the proposed vesting of lands for the road scheme.

3.5 Flood Compensatory Storage

TNI have agreed to the changes in design for the flood compensatory storage areas at this location.

4 Hydrogeological Modelling between Tully Bog and Tully Drain

4.1 Further Assessments

Notwithstanding the decision to change the design to avoid any impacts on the hydrology of Tully Bog and without more detailed site information from intrusive site investigation (boreholes and piezometers) in and adjacent to Tully Bog, further assessment work has been carried out to test possible hydrogeological scenarios between Tully Bog and the flood plain of the Tully Drain to the east. The geological information available (boreholes for the road and geological mapping) suggests that the superficial soils in the area are slightly clayey sand, underlain by the Omagh Sandstone formation. The sand description suggests these might be quite permeable, though the slight clay content is likely to depress that significantly. Whilst there is no information relating to the materials within the bog, such bogs tend to be diplotelmic in nature, with a permeable upper acrotelm layer and a low permeability lower catotelmic layer. This latter layer tends to make such bogs self-sealing hydrologically to a certain degree.

4.2 Modelled Scenarios

Based on the above and the assumptions below, hydrogeological modelling of a number of scenarios for a cross section through the bog and flood compensation areas was carried out (see Appendix A for results)., though it is noted that this modelling shows the impact of infiltration on groundwater levels, rather than vice-versa.

4.3 Model Assumptions

Without actual groundwater levels, a model was constructed using the following conservative assumptions:

- The groundwater level at the flood compensation area is the level of the compensation “floor” (it can’t be higher, and if it were lower, then the compensation area would then not be a controlling influence);
- The average rainfall is 1000mm/year, all of which soaks into the bog;
- Based on a reasonable interpretation of the soil permeability, the groundwater level generated would be just below the bottom of the bog;

- If the rainfall or peat permeability increased, then the groundwater level rapidly rose to ground level; and
- If the peat permeability decreased, then the groundwater level fell slightly (though the water has to go somewhere and is interpreted to be trapped in the bog).

4.4 Conclusions

Following the scenario modelling which is based upon reasonable technical assumptions and judgements, it can be concluded that:

- the relationship between the groundwater level and the water in the bog is complex;
- the nature of the underlying soils is such that that bog must be to a degree self-sealing otherwise it would not retain water; and
- the excavation of the flood compensation area as currently proposed does not seem to have a significant effect upon the ground water level.

4.5 Graphical Outputs

Appendix A provides detail of the hydrological modelling outputs in graphical form.

5 2016 Proposed Scheme

5.1 Drawings

The scheme design has been updated at 2 locations which are shown on drawings nos 718736-S2-0800-1481 and 1482 and described below.

5.2 Area 1

Area 1 - Mainline chainage 48700 to 49200 (Drawing No 718736-S2-0800-1483): In this area, the flood compensatory storage area and associated vesting of land area is reduced alongside Drumlegagh Road South with works focussed on lowering ground levels within the current floodplain, defined by the existing 64m AOD contour, with the ground sloping to the Tully Drain at a level of 62.0m AOD. These works will increase the capacity of the flood plain at this location to compensate for loss of floodplain under the proposed dual carriageway, junction and connecting roads just to the south. The proposed works are now at least 100m away from the SAC and reducing the levels are not envisaged to have any impact on ground water levels in Tully Bog.

Additional land to the east of Tully drain would now be vested to allow lowering the ground level to between 62.0m AOD and approximately 62.5m AOD, extending the flood compensatory storage area between the Tully Drain and the main carriageway of the A5WTC. Being east of the watercourse, works in this area will not affect ground water levels in the Bog.

5.3 Area 2

Area 2 - Mainline chainage 49500 to 49850 (Drawing No 718736-S2-0800-1484): In this area the proposals now include for excavating a new flood compensatory storage area to a level of 62.7m AOD between Drumlegagh Road South and Todds Road. The proposals also include an additional connectivity culvert under the main dual carriageway at chainage 49600 to connect the new flood compensatory storage area to Tully Drain.

5.4 Monitoring

A monitoring regime will be installed prior to construction commencing to establish a baseline groundwater level which will be monitored during the construction period. An action plan will be developed to maintain groundwater levels if records indicate that levels

may be affected by the works, the details of which will be agreed with NIEA as part of the Construction and Environmental Management Plan (CEMP) to be developed and completed by the contractor prior to works commencing.

6 Summary

6.1 Revised Design

The revised design for the flood compensatory storage areas in this area now significantly removes the risk of the ground water regime for Tully Bog being affected by the proposed A5 Western Transport Corridor.

7 Drawings

2010 Proposals

Drawing No 718736-S2-0800-1480: Section 2 – Specimen Design V7.2

2016 Proposals

Drawing No 718736-S2-0800-1481: Proposed Flood Compensatory Storage adjacent to Tully Bog SAC - Plan

Drawing No 718736-S2-0800-1482: Proposed Flood Compensatory Storage adjacent to Tully Bog SAC – Cross Section

Drawing No 718736-S2-0800-1483: Proposed Flood Compensatory Storage adjacent to Tully Bog SAC (Sheet 1 of 2)

Drawing No 718736-S2-0800-1484: Proposed Flood Compensatory Storage adjacent to Tully Bog SAC (Sheet 2 of 2)

A5 BELTANY ROAD

U1527 RASHLI ROAD

U1526 TULLY ROAD

U1611 TODDSTOWN ROAD

C679 DRUMLEGAGH ROAD SOUTH

JUNCTION 11

Tully Bog SAC

48400 48500 48600 48700 48800 48900 49000 49100 49200 49300 49400 49500 49600 49700 49800 49900 50000 50100

LEGEND

- DRAFT REVISED NOTICE OF INTENTION TO MAKE VESTING ORDER (NIMVO)
- DRAFT REVISED TEMPORARY BOUNDARY ASSOCIATED WITH 2014 PROPOSED NIMVO
- SECTION EXTENTS
- V7.2 ALIGNMENT
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- CONNECTIVITY CULVERT
- WATERCOURSE DIVERSION CULVERT
- DRAINAGE OUTFALL
- PIPED CARRIAGEWAY DRAINAGE
- PRE-EARTHWORKS DRAINAGE
- CONCRETE SURFACE WATER CHANNEL
- GRASS SURFACE WATER CHANNEL
- ENVIRONMENTAL MITIGATION
- GROUND IMPROVEMENT
- DEPOSITION AREA CONTOURS
- TEMPORARY SETTLEMENT POND
- DRAINAGE ATTENUATION POND
- FLOOD COMPENSATORY STORAGE
- PROPOSED TEMPORARY WORKING AREAS
- BOUNDARY OF TULLY BOG SAC

DRAFT

SCALE

SCALE 1:2,500 0 25 50 100m

Client: transportni

Project: A5 WTC Western Transport Corridor

Drawing Title: SECTION 2 - SPECIMEN DESIGN V7.2
DESIGN AND NIMVO
TULLY BOG SAC

mouchel building great relationships

Office: Shorefield House
30 Kinnegar Drive
Holywood
County Down
BT18 9JQ

Scales (at A1 size): 1:2500

Purpose of Issue: INFORMATION

Drawing No: 718736-S2-0800-1480

Version: A

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NOTES

1. FOR CROSS-SECTION A-A, REFER TO DRAWING NUMBER 718736-S2-0800-1482.

LEGEND - PLAN

- PROPOSED SCHEME ALIGNMENT
- CONTOURS AT 2m INTERVALS
- 2016 NOTICE OF INTENTION TO MAKE VESTING ORDER (NIMVO)
- DRAFT BOUNDARY FOR TEMPORARY LANDTAKE (SUBJECT TO AGREEMENT)
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- CONNECTIVITY CULVERT
- WATERCOURSE DIVERSION CULVERT
- DRAINAGE OUTFALL
- PIPED DRAINAGE
- PRE-EARTHWORKS DRAINAGE
- CONCRETE SURFACE WATER CHANNEL
- GRASS SURFACE WATER CHANNEL
- RETAINING WALL
- ROAD RESTRAINT SYSTEM
- ENVIRONMENTAL BARRIER
- ENVIRONMENTAL MITIGATION
- DRAINAGE POND
- FLOOD COMPENSATORY STORAGE
- GROUND IMPROVEMENT
- LAND REQUIRED FOR TEMPORARY CONSTRUCTION WORKS
- DEPOSITION AREA CONTOURS
- EDGE OF EXISTING AND PROPOSED FLOOD PLAIN
- BOUNDARY OF TULLY BOG SAC
- 62mAOD APPROXIMATE SPOT LEVELS

THESE DRAWINGS ILLUSTRATE THE PROPOSED SCHEME, THE SPECIFIC DETAILS OF WHICH WOULD BE DEVELOPED FURTHER THROUGH THE DETAILED DESIGN STAGE AND SUBJECT TO APPROVAL.

SCALE

SCALE 1:2500 25 0 50 100

Client: transportni

Project: A5 WTC Western Transport Corridor

Drawing Title: PROPOSED FLOOD COMPENSATORY STORAGE ADJACENT TO TULLY BOG SAC - PLAN

mouchel building great relationships

Office: Shorefield House, 30 Kinnegar Drive, Holywood, County Down, BT18 9JQ

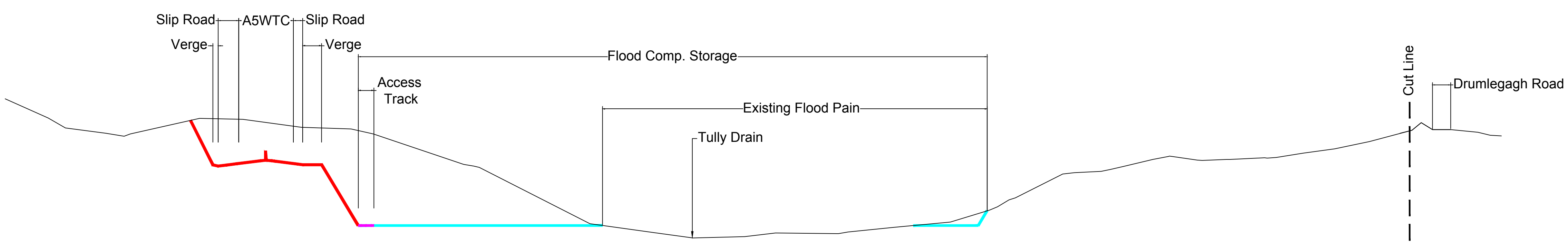
Scales (at A1 size): 1:2500

Purpose of Issue: INFORMATION

Drawing No: 718736-S2-0800-1481

Version: A

DRAWING FILE LOCATION / NAME G:\1058654 A5WTC (UES) Highways\09 Documents\05 Drawings\05 Drawings\0800\Tully Bog\718736-S2-0800-1481 & 1482 TULLYBOG PLAN & XSEC.dwg PLOT DATE 11 Jul 2016 TIME 11:46:04



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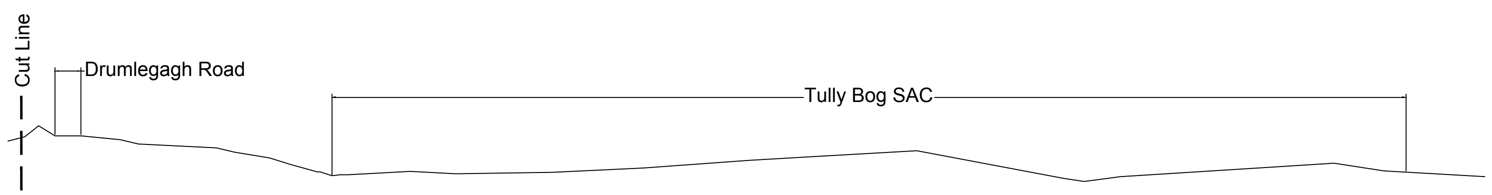
Comp Storage Levels	67.125 62.573 62.373 62.373 63.750
Existing Ground Levels	72.278 70.815 70.044 69.642 69.604 70.788 70.719 70.105 69.964 69.593 67.124 62.706 62.033 61.627 61.729 62.006 62.069 62.433 62.844 63.750 64.550 66.522 66.618 66.729 67.097 67.651 67.880 67.569 67.641 67.748 68.121 68.450 69.013 69.923 69.729 69.500

Proposed A5WTC Chainage = 48850.000



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Comp Storage Levels	
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Proposed A5WTC Chainage = 48850.000

CROSS-SECTION A-A

NOTES

1. ALL MEASUREMENTS ARE IN METRES.
2. FOR LOCATION OF CROSS-SECTION A-A, REFER TO DRAWING NUMBER 718736-S2-0800-1481.

LEGEND - CROSS-SECTION

- A5 WESTERN TRANSPORT CORRIDOR
- ACCESS TRACK
- FLOOD COMPENSATION STORAGE
- EXISTING GROUND

THESE DRAWINGS ILLUSTRATE THE PROPOSED SCHEME, THE SPECIFIC DETAILS OF WHICH WOULD BE DEVELOPED FURTHER THROUGH THE DETAILED DESIGN STAGE AND SUBJECT TO APPROVAL.

Client: transportni

Project: A5 WTC Western Transport Corridor

Drawing Title: PROPOSED FLOOD COMPENSATORY STORAGE ADJACENT TO TULLY BOG SAC - CROSS SECTION

mouchel building great relationships

Office: Shorefield House, 30 Kinnegar Drive, Holywood, County Down, BT18 9JQ

Scales (at A1 size): H: 1:1000, V: 1:200

Purpose of Issue: INFORMATION

Drawing No: 718736-S2-0800-1482

Version: A

DRAWING FILE LOCATION / NAME G:\1058654 A5WTC (UES) Highways\09 Documents\05 Drawings\05 Drawings\0800\Tully Bog\718736-S2-0800-1481 & 1482 TULLYBOG PLAN & XSEC.dwg PLOT DATE 24 Mar 2016 TIME 10:42:06

Tully Drain

62mAOD

62mAOD

Proposed area to be excavated to approx. 62mAOD to create flood compensatory storage.

62mAOD

62mAOD

68mAOD

Tully Bog SAC

Proposed A5WTC

Newtownstewart

EXISTING A5 BELTANY ROAD (NORTH)

DRUMLEGAGH ROAD SOUTH

EXISTING A5

Omagh

48200

48800

48900

49000

49100

49200

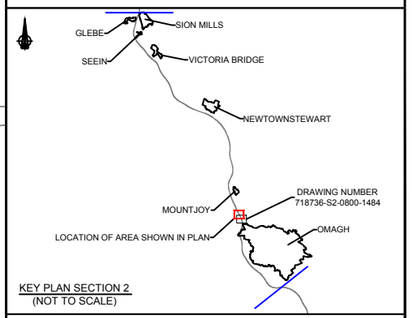
49300

49400

WC

LEGEND - PLAN

- PROPOSED SCHEME ALIGNMENT
- 2016 NOTICE OF INTENTION TO MAKE VESTING ORDER(NIMVO)
- DRAFT BOUNDARY FOR LIMIT OF TEMPORARY LANDTAKE (SUBJECT TO AGREEMENT)
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- CONNECTIVITY CULVERT
- WATERCOURSE DIVERSION CULVERT
- DRAINAGE OUTFALL
- PIPED DRAINAGE
- PRE-EARTHWORKS DRAINAGE
- CONCRETE SURFACE WATER CHANNEL
- GRASS SURFACE WATER CHANNEL
- LAND REQUIRED FOR TEMPORARY CONSTRUCTION WORKS
- BOUNDARY OF TULLY BOG SAC
- 62mAOD — APPROXIMATE SPOT LEVELS
- DRAINAGE POND
- FLOOD COMPENSATORY STORAGE



DRAWING NUMBER 718736-S2-0800-1484

KEY PLAN SECTION 2
(NOT TO SCALE)

THESE DRAWINGS ILLUSTRATE THE PROPOSED SCHEME, THE SPECIFIC DETAILS OF WHICH WOULD BE DEVELOPED FURTHER THROUGH THE DETAILED DESIGN STAGE AND SUBJECT TO APPROVAL.

Client: transportni

Project: A5 WTC Western Transport Corridor

Drawing Title: PROPOSED FLOOD COMPENSATORY STORAGE ADJACENT TO TULLY BOG SAC SHEET 1 OF 2

mouchel building great relationships

Office: Shorefield House, 30 Kinnegar Drive, Holywood, County Down, BT18 9JQ

Scales (at A1 size): 1:1250

Purpose of Issue: INFORMATION

Drawing No: 718736-S2-0800-1483

Version: A

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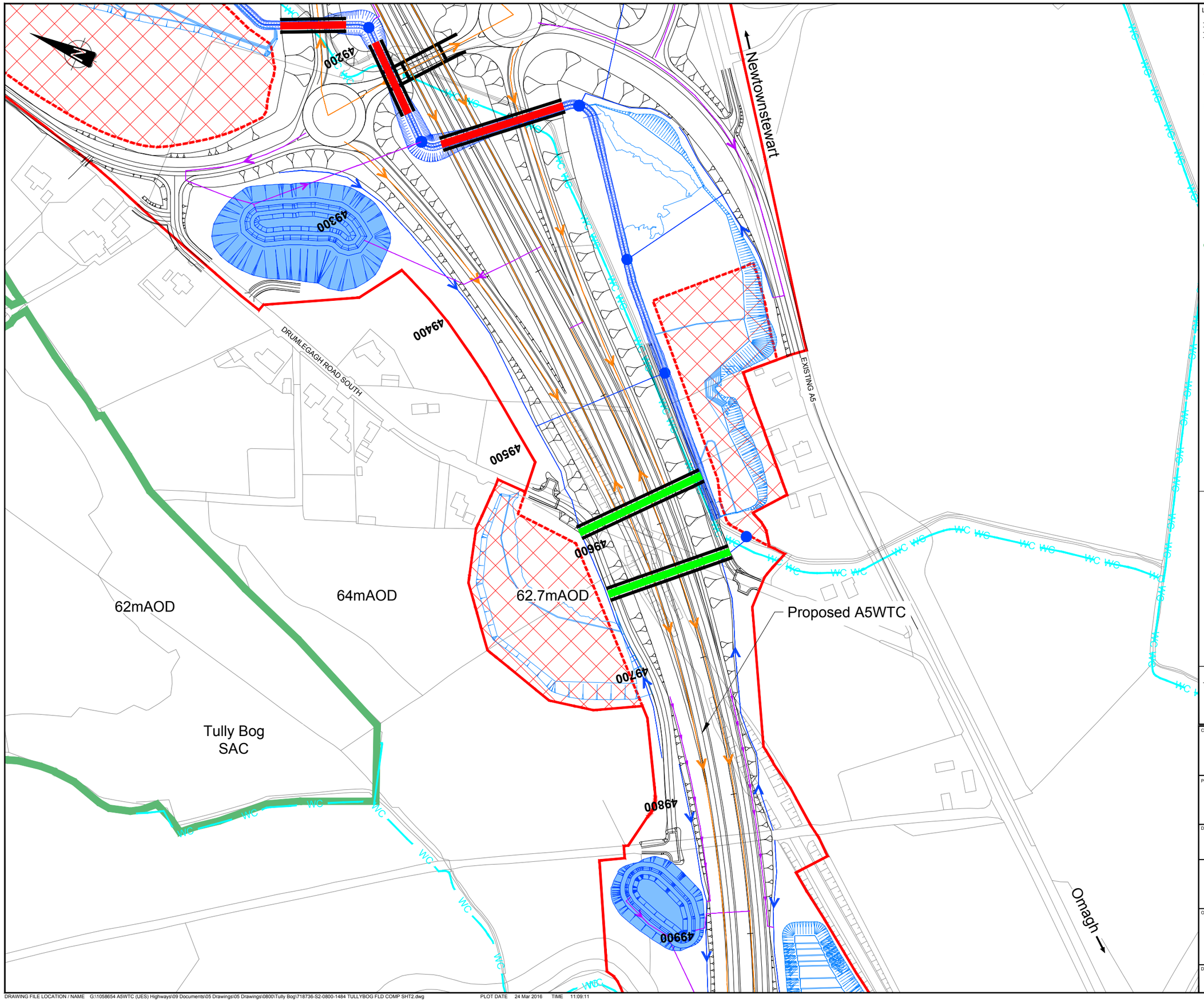
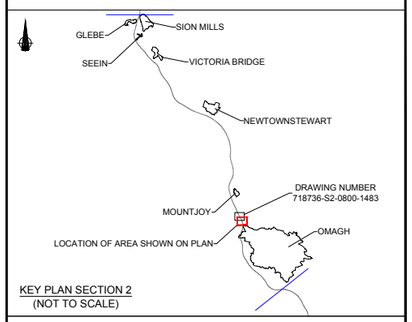


LEGEND - PLAN

- PROPOSED SCHEME ALIGNMENT
- 2016 NOTICE OF INTENTION TO MAKE VESTING ORDER(NIMVO)
- DRAFT BOUNDARY FOR LIMIT OF TEMPORARY LANDTAKE (SUBJECT TO AGREEMENT)
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- CONNECTIVITY CULVERT
- WATERCOURSE DIVERSION CULVERT
- DRAINAGE OUTFALL
- PIPED DRAINAGE
- PRE-EARTHWORKS DRAINAGE
- CONCRETE SURFACE WATER CHANNEL
- GRASS SURFACE WATER CHANNEL
- LAND REQUIRED FOR TEMPORARY CONSTRUCTION WORKS
- BOUNDARY OF TULLY BOG SAC
- 62mAOD — APPROXIMATE SPOT LEVELS
- DRAINAGE POND
- FLOOD COMPENSATORY STORAGE



KEY PLAN SECTION 2
(NOT TO SCALE)

THESE DRAWINGS ILLUSTRATE THE PROPOSED SCHEME, THE SPECIFIC DETAILS OF WHICH WOULD BE DEVELOPED FURTHER THROUGH THE DETAILED DESIGN STAGE AND SUBJECT TO APPROVAL.

Client: transportni

Project: A5 WTC Western Transport Corridor

Drawing Title: PROPOSED FLOOD COMPENSATORY STORAGE ADJACENT TO TULLY BOG SAC SHEET 2 OF 2

mouchel building great relationships
Office: Shorefield House, 30 Kinnegar Drive, Holywood, County Down, BT18 9JQ

Scales (at A1 size): 1:1250

Purpose of Issue: INFORMATION

Drawing No: 718736-S2-0800-1484

Version: A

DRAWING FILE LOCATION / NAME G:\1058654 A5WTC (UES) Highways\09 Documents\05 Drawings\05 Drawings\0800\Tully Bog\718736-S2-0800-1484 TULLYBOG FLD COMP SHT2.dwg PLOT DATE 24 Mar 2016 TIME 11:09:11

8 Appendix A Hydrogeological Modelling of Scenarios

(AN ASSESSMENT OF THE RELATIONSHIP OF PERMEABILITY AND RAINFALL ON THE GROUNDWATER LEVEL AT TULLY BOG)

1 A hydrological model has been constructed using the groundwater modelling module in the SLIDE software to assess the impact of excavation of the flood compensatory storage areas on the hydrology of the Tully Bog.

2 The model assumes that the excavated bench for the flood compensation fixes the max groundwater level at one end of the section.

3 No assumption is made about groundwater level within or below the bog. An average annual rainfall is provided and if that soaks into the bog, the impact on the underlying groundwater level is assessed.

4 A sensitivity check to infiltration and permeability of the bog is made.

5 It is acknowledged that the model assesses the impact on infiltration on groundwater level, rather than vice versa.

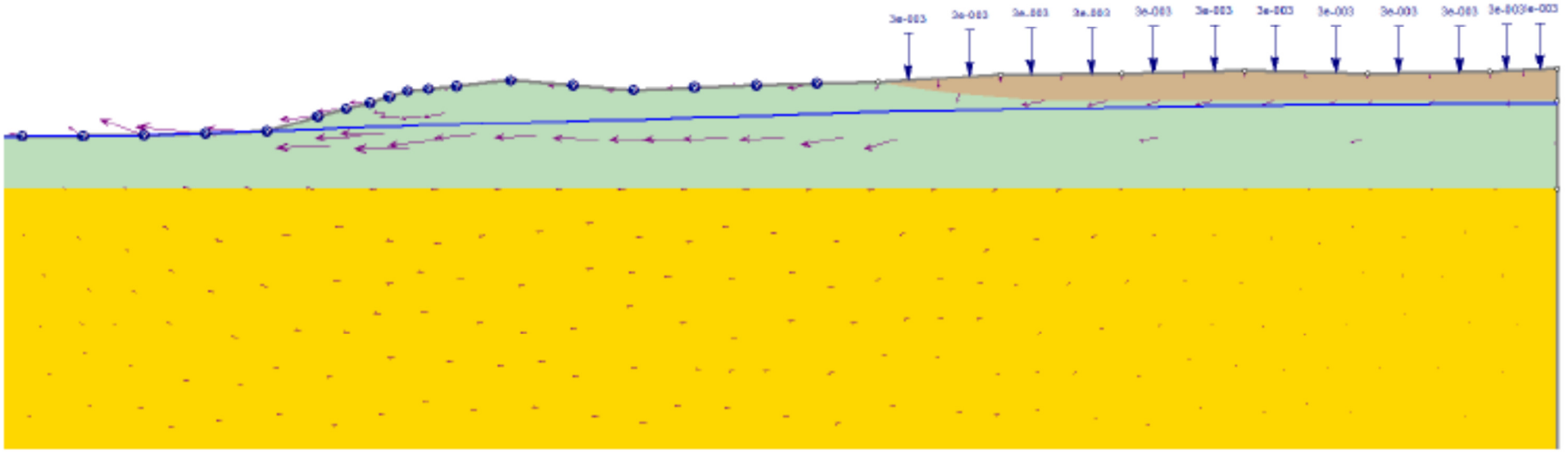
Tully Bog after Excavation

Case 1 - Properties are the same as prior to excavation

Phreatic surface appears to be slightly below the base of the peat. However, it is likely that capillary action will prevent the peat becoming unsaturated, along with infiltration from rainwater. This model has taken an average annual rainfall and calculated it as an average rainfall per day. Realistically the rainfall will vary throughout the year and due to the low permeability of the peat is unlikely to dry out.

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Raised Peat Bog		20	Mohr-Coulomb	0	20
Slightly clayey coarse Sand		20	Mohr-Coulomb	0	20
Sandstone		21	Mohr-Coulomb	0	40

Material Name	Color	Model	K1 (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Raised Peat Bog		Simple	1e-008	0.5	0	Loam
Slightly clayey coarse Sand		Simple	1e-006	1	0	Sand
Sandstone		Simple	1e-007	1	0	Sand

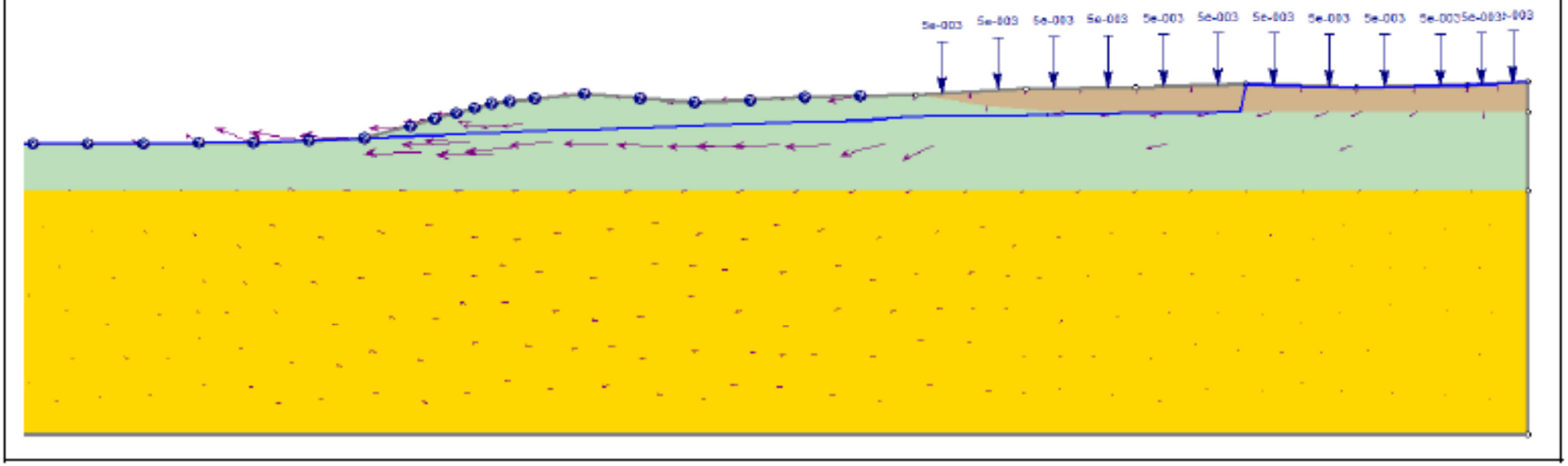


Tully Bog after Excavation

Case 2 - Increased vertical infiltration to 0.005m/d.

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Raised Peat Bog		20	Mohr-Coulomb	0	20
Slightly clayey coarse Sand		20	Mohr-Coulomb	0	30
Sandstone		21	Mohr-Coulomb	0	40

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Raised Peat Bog		Simple	1e-008	0.5	0	Loam
Slightly clayey coarse Sand		Simple	1e-006	1	0	Sand
Sandstone		Simple	1e-007	1	0	Sand

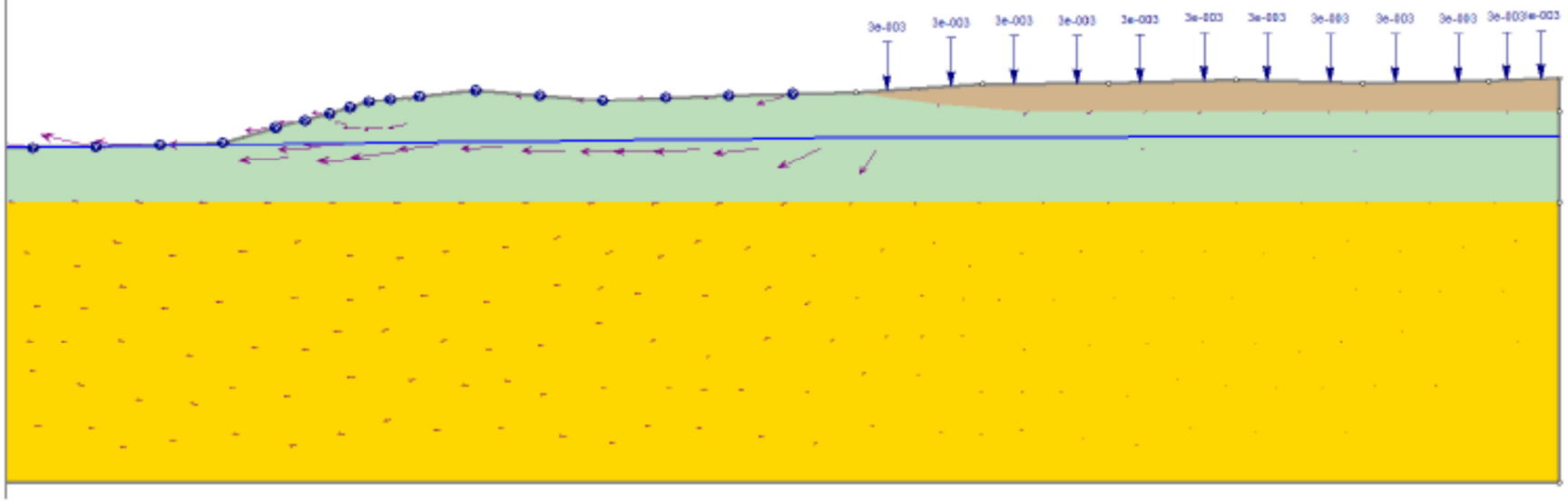


Tully Bog after Excavation

Case 3 - Decreased permeability of peat and changed infiltration back to original value.

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Raised Peat Bog		20	Mohr-Coulomb	0	20
Slightly clayey coarse Sand		20	Mohr-Coulomb	0	30
Sandstone		21	Mohr-Coulomb	0	40

Material Name	Color	Model	KS (m/s)	K2/K1	K1 Angle (deg)	Soil Type
Raised Peat Bog		Simple	1e-009	0.5	0	Loam
Slightly clayey coarse Sand		Simple	1e-006	1	0	Sand
Sandstone		Simple	1e-007	1	0	Sand



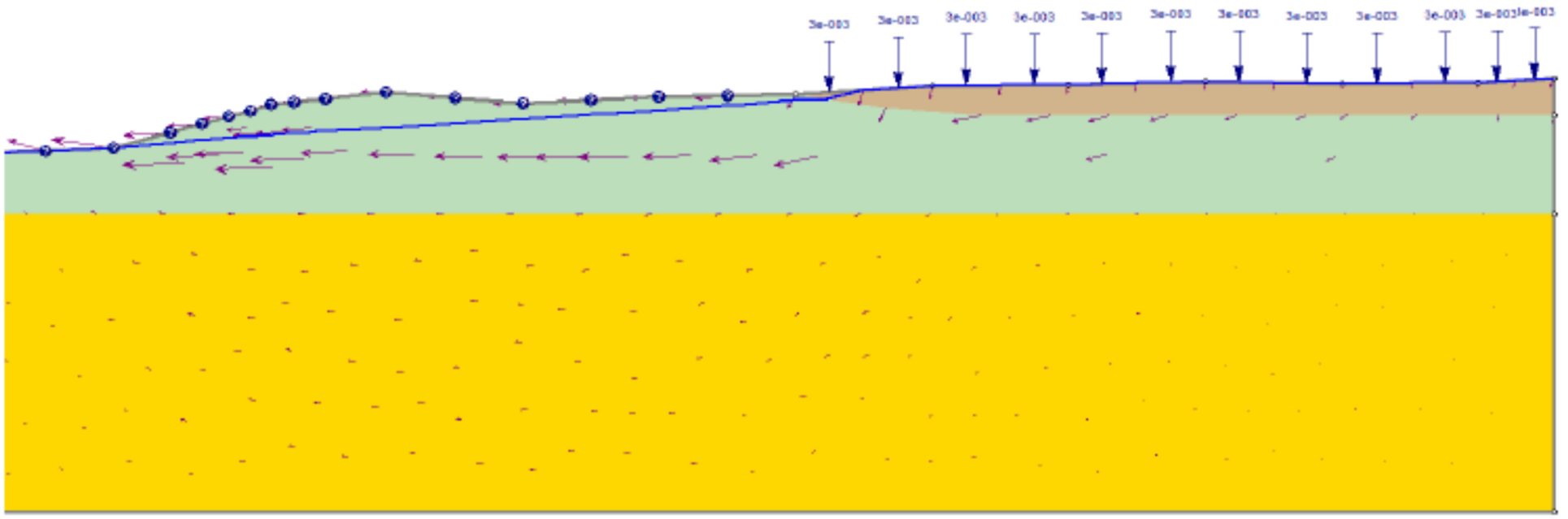
Tully Bog after Excavation

Case 4 - Increased permeability of peat

The permeability of the peat has increased and the phreatic surface is now at the top of the peat bog.

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Raised Peat Bog		20	Mohr-Coulomb	0	20
Slightly clayey coarse Sand		20	Mohr-Coulomb	0	20
Sandstone		21	Mohr-Coulomb	0	40

Material Name	Color	Model	KS (m/d)	K2/K1	K1 Angle (deg)	Soil Type
Raised Peat Bog		Simple	1e-007	0.5	0	Loam
Slightly clayey coarse Sand		Simple	1e-006	1	0	Sand
Sandstone		Simple	1e-007	1	0	Sand



Appendix 3: Tully Bog Natura 2000 Standard Data Form

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NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030326**

SITENAME **Tully Bog**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0030326

1.3 Site name

Tully Bog

1.4 First Compilation date	1.5 Update date
2003-04	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	2003-04
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-05
National legal reference of SAC designation:	Regulations 6-7 and 10-12 of The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (http://www.legislation.gov.uk/nisr/1995/380/contents/made) as amended by The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (http://www.legislation.gov.uk/nisr/2004/435/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-7.349722222	54.62583333

2.2 Area [ha]:

36.06

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKN0	Northern Ireland

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

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3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
7110	X		23.8		G	B	C	B	B
7120			10.85		G	D			

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N10	3.8
N16	27.4
N07	68.8
Total Habitat Cover	99.99999999999999

Other Site Characteristics

1 Terrestrial: Soil & Geology: nutrient-poor,peat,acidic 2 Terrestrial: Geomorphology and landscape: floodplain,lowland

4.2 Quality and importance

Active raised bogs for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	K02		I
H	J02		I
H	H04	N	I
H	J01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the DOENI link below provides access to the Conservation Objectives for this site. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

https://www.doeni.gov.uk/sites/default/files/publications/doe/land-information-tully-bog-conservation-objectives-2015.pdf

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

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6.1 Body(ies) responsible for the site management:

Organisation:	Northern Ireland Environment Agency
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

Appendix 4: DMRB Integrity of Site Checklist

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Table A4.1 Tully Bog SAC Integrity of Site Checklist

Conservation Objectives	
Does the project have potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Interrupt progress towards achieving the conservation objectives of the site?	~~Yes~~/No
Disrupt those factors which help maintain the favourable conditions of the site?	~~Yes~~/No
Interfere with the balance, distribution and density of key species that are indicators of favourable conditions of the site?	~~Yes~~/No

Other Indicators	
Does the project have potential to:	
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystems?	~~Yes~~/No
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	~~Yes~~/No
Interfere with predicted or expected natural changes to the site (such as water dynamics of chemical composition)?	~~Yes~~/No
Reduce the area of key habitats?	~~Yes~~/No
Reduce the population of key species?	~~Yes~~/No
Change the balance between key species?	~~Yes~~/No
Reduce the diversity of the site?	~~Yes~~/No
Result in disturbance that could affect population size or density of the balance between key species?	~~Yes~~/No
Result in fragmentation?	~~Yes~~/No
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc)?	~~Yes~~/No

Appendix 5: Tully Bog SAC Conservation Objectives

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TULLY BOG SAC
UK0030326

CONSERVATION OBJECTIVES

Document Details

Title	*Tully Bog SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] to ensure that all habitats and species of Community Interest are maintained or restored to Favourable Conservation Status (FCS). Natura 2000 sites have a crucial role to play in achieving this overall objective since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.

To ensure that each Natura 2000 site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the Natura 2000 network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, Natura 2000 sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

[1] 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition

- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.

- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status as defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas it covers within that range are stable or increasing, and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as when:

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

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as "**the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site**".

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4. SITE INFORMATION

COUNTY: TYRONE

GRID REFERENCE: H420755

AREA: 36 ha

5. SUMMARY SITE DESCRIPTION

Tully Bog is an isolated lowland raised bog lying in a shallow hollow within the former flood plain of the Lower Fairy Water River. The central intact dome is fairly well developed and supports a weak temporary pool system with a good hummock and hollow development on the bog plain.

There is a small raised drumlin in the centre of the bog, which is covered by a shallow layer of peat, where birch woodland has developed. Close to this, a linear pool with *S. cuspidatum* has formed in a deep, narrow fissure in the peat's surface. This may be the result of marginal cutting. *S. imbricatum* and *S. fuscum* are present.

Disturbance to the bog had been confined to cutting and occasional burning on both the intact core and cutover margins.

Further details of the site are contained in the ASSI Citation and Views About Management statement, which are available on the NIEA website (www.doeni.gov.uk/niea).

5.1 BOUNDARY RATIONALE

The boundary uses permanent man-made features all around the periphery. The boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and Birch scrub.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**23.77 ha**
Habitat	Degraded raised bog still capable of regeneration	D	10.87 ha

Table 1. List of SAC selection features. Those with global status A-C will be referred to in ANNEX I.

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex I habitat. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

A - Sites holding outstanding examples of the habitat in a European context.

B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.

C - Examples of the habitat which are of at least national interest (i.e. usually above the thresholdfor SSSI/ASSI notification on terrestrial sites) but not significantly above this. These habitats are not the primary reason for SACs being selected.

D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction but it is important to note that all three grades are qualifying SAC interest features.

Click here to go to the Natura 2000 Standard Data Form for Tully Bog SAC.

6.1 ASSI SELECTION FEATURES

Tully Bog ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	36 ha

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the active raised bog to favourable condition.

For each SAC/ASSI feature, there are a number of component objectives which are outlined in the tables below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annexes.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

SAC Feature	Global Status	Component Objective
Active raised bog	B	Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation.
		Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species.
		Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog.
		Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog.
		Maintain the hydrology of the raised bog peat mass.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

ASSI Feature	Component Objective
Lowland Raised Bog	Maintain the extent of intact lowland raised bog.
	Seek to expand the extent of actively regenerating raised bog.
	Maintain the hydrology of the raised bog peat mass.

10. MANAGEMENT CONSIDERATIONS

Ownership
12 owners hold both mineral and sporting interests; DETI hold mineral interests and DARD hold sporting interests.

Adjoining Land Use
The land surrounding the site is intensively managed agricultural land in silage and grazing.

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive, but deals with the most likely factors that are either affecting Tully Bog, or could affect it in the future. Although Active Raised Bog is the qualifying SAC feature, factors affecting ASSI features are also considered.

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

Peat Cutting
There has been extensive hand cutting for many years around the periphery. Along the edge of the intact bog, the cut peat face is high in places, resulting in localised desiccation of the adjacent intact surface. Although the old hand cuttings now support either actively regenerating bog vegetation or birch wood, localised mechanised peat cutting has been carried out within the former in recent years at the northern end of the site. In one instance, mechanised cutting had encroached onto the intact surface of the bog. Peat cutting at the time of designation was not seen as problematical.
ACTION: No unauthorised peat cutting within the SAC.

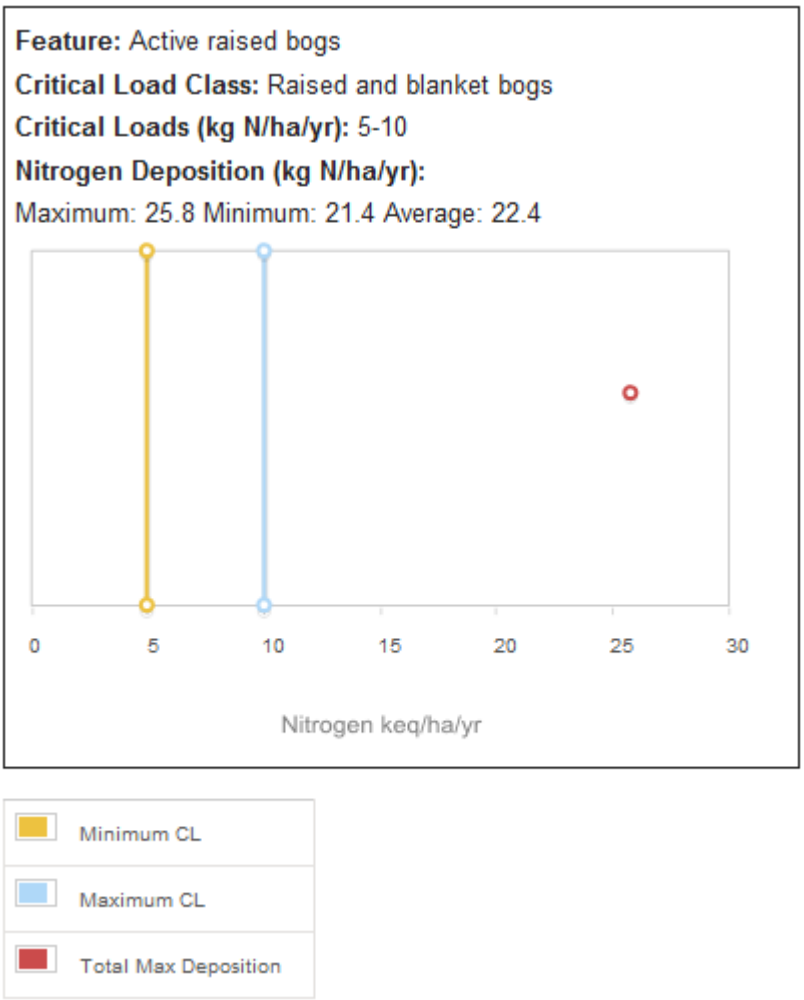
Burning
Burning of the vegetation has taken place occasionally. NIEA surveys reported some evidence of burning over most of the northern half; in a limited area the effect was described as severe. However, the most recent NIEA habitat survey concluded that the bog had recovered well. Excessive burning will tend to reduce the cover of *Sphagnum* mosses and ericaceous species, increasing the proportion of *Molinia caerulea* and *Trichophorum cespitosum*. In addition, structural diversity will be reduced as many of the rarer and more prominent hummock-forming species (such as *S. imbricatum*) appear to be particularly susceptible to burning.
ACTION: No burning within the SAC.

Drainage
The intact surface remains largely free of drains. However, there are a few old drains associated with the cuttings around the periphery. Any drains that are

currently carrying water away from the peat mass should be identified and blocked. Note that drainage works outside of the site's boundaries could potentially impact on the bog's hydrology.
ACTION: Block active drains where appropriate.

Grazing
Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.
ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

Nitrogen Deposition
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Tully Bog SAC.



(Source: Air Pollution Information System (APIS) website- www.apis.ac.uk)

ACTION: Seek to maintain or where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant critical load.

Scrub Encroachment

Trees and scrub growth is extensive within the cutover bog extending right up to the periphery of the intact area in parts. In addition a localised stand of trees and shrubs is growing in the centre of the intact area due to the presence of mineral soil close to the surface here. Scattered birch scrub is extending out from this isolated stand onto the intact surface to the east. Scrub encroachment into the actively regenerating cutover areas, or onto the intact surface is undesirable and generally indicates drying out. Even where this is not the case, scrub can damage the bog vegetation through such factors as shading and leaf litter. In addition, tree roots may disrupt the hydrological function of the underlying acrotelm and catotelm, and act as nitrogen fixers (e.g. Birch), thus altering the chemical composition of the peat.

ACTION: Monitor scrub encroachment and take remedial action if required. Remove any invasive exotic species, such as Rhododendron as a matter of urgency.

Fly-tipping

There have been a few localised incidents of fly-tipping in the cutover area of the bog. A more serious problem occurs to the north of the bog where extensive infilling over a small area was carried out prior to designation. This infilling consists of hard-core infill which has now risen well above the surface of the bog. The dump was included within the site to prohibit further expansion. It has now been consented as a storage area as part of a Management Agreement.

ACTION: If localised fly-tipping does occur, it should be removed as soon as possible to help prevent any further incidences of dumping.

Changes to surrounding land use

Any changes in local land-use e.g. drainage, road improvements, afforestation, agricultural intensification and development, may be detrimental to the SAC.

Action: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change

Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.

ACTION:When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. MONITORING

Monitoring of SACs takes place on using two monitoring techniques.

Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the bog and associated habitats through desiccation).

These longer-term changes will be picked up by monitoring of the feature via **Site Condition Assessment** - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Site Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology has been modified to reflect individual site attributes in Northern Ireland.

12.1 MONITORING SUMMARY

- *Monitor the integrity of the site (SIM or Compliance Monitoring)*
  Complete boundary survey. Ensure that there has been no peat cutting, dumping or burning carried out within the SAC boundary. This SIM should be carried out once a year.

- *Monitor the condition of the site (Condition Assessment)*
  Monitor the key attributes for the active raised bog. This will detect if the active raised bog is in favourable condition or not. See Annex 1 for SAC features.

The favourable condition table provided in Annex 1 is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

13. REFERENCES

Cooper, A., McCann, T. and Rogers, D. (2009). Northern Ireland Countryside Survey 2007: Broad Habitat Change 1998-2007. Northern Ireland Environment Agency Research and Development Series No.09/06

Cruickshank, M. M. & Tomlinson, R. W. (1988). *Northern Ireland Peatland Survey*. Department of the Environment for Northern Ireland (Countryside and Wildlife Branch). Belfast.

Department of the Environment for Northern Ireland (1993a). Conserving Peatland in Northern Ireland – A Statement of Policy.

Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan - Lowland Raised Bog.

European Commission (2000). Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2001). Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2014). Establishing conservation measures for Natura 2000 Sites.

Joint Nature Conservation Committee (JNCC) (2013). 3rd UK Habitats Directive Report.

ANNEX 1

Feature 1
SAC Feature – Active raised bog

(* = primary attribute. One failure among primary attributes = unfavourable condition)

Attribute	Targets/Limits	Method of Assessment	Field Notes	Comments
Extent				
*Area of intact surface (ha)	Maintain the extent of intact bog surface (at 16.72 ha).	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	No loss of intact raised bog was observed during the condition assessment, but SIM and aerial photographs were not consulted.	Any loss of the current intact area is unacceptable. The active raised bog communities include M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.

*Area of actively regenerating cutover bog (ha)	Maintain the current extent of actively regenerating cutover bog (7.05 ha). This area should be extended where possible.	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.		There should be no loss in extent of actively regenerating bog to scrub encroachment or further peat cutting.
* Area of mosaic communities and associated habitats	Maintain associated mosaic communities and habitats (bog woodland, fen, etc)	Visual estimate across the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The condition of this attribute cannot be assessed until the next monitoring period.	Repeat monitoring using condition assessment, SIM, and aerial photographs should indicate whether mosaics and associated habitats have changed or been lost.
Structure				
Dwarf-shrub height	Average ericoid height should be 15 – 35 cm.	Visual estimate in 2x2 m plots.		
*Bare Peat (%)	Peat cutting or drainage should not damage the intact surface of the active raised bog. Bare peat should occupy < 5% of the total area of the active raised bog.	Visual estimate in 2x2m plots		

*Pool/hummock system extent and diversity	The extent and diversity of the raised bog pool system must be at least maintained. Permanent pools containing any of the species listed below within a 10 m radius of the plot should be recorded. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia,* Menyanthes trifoliata.	Visual estimate within a 10m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	The condition of this attribute cannot be assessed until the next monitoring period.	Pool systems do not always occur on lowland raised bog systems. However, where they do occur, they are a very important micro-topographical feature of bog surface and their extent and condition should be maintained. Tully Bog supports a weak temporary pool complex, but hummocks are well developed.

Vegetation Composition – Positive Indicators				
Sphagnum Cover/Abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* moss species should have a minimum cover of 33% over at least 66% of the intact lowland raised bog surface. Thick, hummock forming species of sphagnum should be at least occasional.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least Occasional over the surface.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
*Ericaceous Cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* should be at least present over a minimum 66% of the intact lowland raised bog surface.	Visual estimate in 2x2m plots		A mono-dominant sward of *Calluna vulgaris* may suggest that the surface of the intact bog is drying out – i.e. the water table is too far below the surface of the bog.
*Graminoid Cover (%)	Graminoid cover should be maintained between 10 and 40%.	Visual estimate in 2x2m plots		

Vegetation Composition – Indicators of negative Change				
*Frequency and % cover of scrub/tree encroachment on any active peat surface (DAFOR and % cover)	Scrub/tree encroachment should be no more than Rare on the intact raised bog surface or in the actively regenerating cutover areas. Mean cover should be less than 2%.	Visual estimate within a 10 m radius of plots and across the active peat surface using aerial photographs and Condition Assessment structured walk.		If scrub/tree species are more than rare on any active peat surface, scrub control should be carried out.
**Rhynchospora alba* Abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots		*Rhynchospora alba* only occurs as a natural component of the bog vegetation around pool systems. A high frequency of this species over the intact surface of the bog may be a consequence of excessive burning.
**Myrica gale* Abundance (% cover)	*Myrica gale* cover should be less than 10%.	Visual estimate in 2x2m plots		

* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the intact raised bog surface and the actively regenerating cutover areas.	Visual estimate in 2x2 m plots and across the active bog surface using a combination of aerial photographs and Condition Assessment structured walk.	Recent burning is represented by areas burnt within the last two years.	
* Management - Grazing (% cover)	Signs of grazing (poaching/dung) should be no more than rare on the intact raised bog surface and the actively regenerating cutover areas.	Visual estimate in 2x2 m plots.		The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing.
Indicators of Local Distinctiveness				
* Presence of rare or scarce species specific to the site. *Sphagnum austinni* *Sphagnum fuscum*	Locally distinctive species recorded for the site should be at least present along the length of the Condition Assessment structured walk.	Name the species at least present along the length of the Condition Assessment structured walk.		If these species are not recorded on any one visit, it does not automatically make the site unfavourable.

Appendix 6 : Calculation Error in Published ES Nitrogen Deposition Results at Tully Bog

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Corrected ES Results

In Appendix 8H (*Table 8H.14*) of the published environmental statement (ES), the results presented for nitrogen (N) deposition at Tully Bog SAC (*see Table A5-1*) incorporated an error by way of a missed calculation step in the processing of model results. This resulted in the over-prediction of N-deposition impacts associated with the proposed A5WTC. The text below explains the error and the amendment that has been applied to revise the ES results (*see Table A5-2*).

Table A5-1 Annual Mean Nitrogen Deposition Rates at Tully Bog SAC – Published ES Results

Distance from nearest affected road (m)	Total N-Deposition Rate (kg N ha^{-1} yr^{-1})						
	2013 BY	Phase Two (2038)			Phase Three (2028)		
		2023 DM	2023 DS	DS-DM	2028 DM	2028 DS	DS-DM
ES Reported Results							
0.6m	30.14	22.47	21.50	**0.03**	20.20	20.40	**0.20**
10m	28.24	21.73	21.94	**0.21**	19.72	19.92	**0.20**
20m	27.71	21.55	21.77	**0.22**	19.58	19.78	**0.20**
30m	27.46	21.48	21.70	**0.22**	19.52	19.72	**0.20**
40m	27.32	21.43	21.65	**0.22**	19.48	19.68	**0.20**
50m	27.22	21.40	21.61	**0.21**	19.46	19.65	**0.19**
60m	27.15	21.38	21.59	**0.21**	19.44	19.63	**0.19**
70m	27.10	21.36	21.57	**0.21**	19.43	19.61	**0.18**
80m	27.05	21.35	21.55	**0.20**	19.42	19.59	**0.17**
90m	27.02	21.34	21.53	**0.19**	19.41	19.58	**0.17**
100m	26.99	21.33	21.52	**0.19**	19.40	19.57	**0.17**
110m	26.96	21.32	21.51	**0.19**	19.40	19.56	**0.16**
120m	26.94	21.31	21.50	**0.19**	19.39	19.55	**0.16**
130m	26.92	21.30	21.49	**0.19**	19.39	19.54	**0.15**
140m	26.90	21.30	21.48	**0.18**	19.38	19.53	**0.15**
150m	26.88	21.29	21.47	**0.18**	19.38	19.53	**0.15**
160m	26.87	21.29	21.46	**0.17**	19.37	19.52	**0.15**
170m	26.85	21.28	21.45	**0.17**	19.37	19.51	**0.14**
180m	26.84	21.28	21.45	**0.17**	19.37	19.51	**0.14**
190m	26.83	21.28	21.44	**0.16**	19.36	19.50	**0.14**
200m	26.82	21.27	21.43	**0.16**	19.36	19.50	**0.14**

* Values reported to 2 d.p.

Table A5-2 Annual Mean Nitrogen Deposition Rates at Tully Bog SAC – Amended ES Results

Distance from nearest affected road (m)	Total N-Deposition Rate (kg N ha^{-1} yr^{-1})						
	2013 BY	Phase Two (2038)			Phase Three (2028)		
		2023 DM	2023 DS	DS-DM	2028 DM	2028 DS	DS-DM
Amended ES Results							
0.6m	23.31	18.86	18.87	**0.00**	17.03	17.05	**0.02**
10m	23.12	18.79	18.81	**0.02**	16.98	17.00	**0.02**
20m	23.07	18.77	18.79	**0.02**	16.96	16.98	**0.02**
30m	23.04	18.77	18.79	**0.02**	16.96	16.98	**0.02**
40m	23.03	18.76	18.78	**0.02**	16.95	16.97	**0.02**
50m	23.02	18.76	18.78	**0.02**	16.95	16.97	**0.02**
60m	23.01	18.76	18.78	**0.02**	16.95	16.97	**0.02**
70m	23.01	18.75	18.77	**0.02**	16.95	16.97	**0.02**
80m	23.00	18.75	18.77	**0.02**	16.95	16.96	**0.02**
90m	23.00	18.75	18.77	**0.02**	16.95	16.96	**0.02**
100m	22.99	18.75	18.77	**0.02**	16.95	16.96	**0.02**
110m	22.99	18.75	18.77	**0.02**	16.95	16.96	**0.02**
120m	22.99	18.75	18.77	**0.02**	16.94	16.96	**0.02**
130m	22.99	18.75	18.77	**0.02**	16.94	16.96	**0.02**
140m	22.99	18.75	18.77	**0.02**	16.94	16.96	**0.02**
150m	22.98	18.75	18.76	**0.02**	16.94	16.96	**0.02**
160m	22.98	18.75	18.76	**0.02**	16.94	16.96	**0.02**
170m	22.98	18.75	18.76	**0.02**	16.94	16.96	**0.01**
180m	22.98	18.75	18.76	**0.02**	16.94	16.96	**0.01**
190m	22.98	18.75	18.76	**0.02**	16.94	16.96	**0.01**
200m	22.98	18.74	18.76	**0.02**	16.94	16.96	**0.01**

* Values reported to 2 d.p.

Converting NO_2 concentrations to Dry Nitrogen Deposition rates

The assessment of N-deposition at Tully Bog was completed with reference to the calculation steps stated in DMRB HA207/07, *Annex F – Assessment of Designated Sites*. Step 5 of the calculation process within Annex F states that:

"…Dry NO_2 deposition rates should be estimated using the following scaling factor which is based on a deposition velocity for NO_2 of 0.001 m/s (taken from EMEP Eulerian photochemistry model). ***1 µg/m^3 of NO_2 = 0.1kg N ha^{-1} yr^{-1}.***"

Background NO_2 concentration values were derived in accordance with the Annex F calculation steps and the above **0.1 scaling factor <u>was applied</u> to calculate the background N-deposition** (i.e. before the contributions from the existing A5 (Do Minimum) and proposed A5WTC (Do Something) were added).

The atmospheric dispersion model (ADMS-Roads) was used to predict the NO_x concentrations at the Tully Bog receptor transect, based on emissions from the assessed roads only, included

in both the Do Minimum and Do Something model scenarios. The NO_x contributions from road sources were converted to NO_2 concentrations with reference to HA207/07 and Defra guidance, as reported in the ES. However, **the 0.1 scaling factor <u>was not applied</u> to the NO_2 concentrations to derive N-deposition attributable to the modelled road sources**. Therefore, the reported N-deposition totals in the ES (*as per Table A5-1*) included a road increment N-deposition equating to a scaling factor of ***1 µg/m^3 of NO_2 = 1kg N ha^{-1} yr^{-1}***.

This missed calculation step resulted in the predicted impact of the proposed A5WTC being overestimated by a factor of 10, with respect to N-deposition at Tully Bog.

To address this error, the reported ES results for Tully Bog were revised to apply the 0.1 scaling factor to predicted road increment NO_2 concentrations at the transect receptors. Therefore, the revised values for Tully Bog (*as per Table A5-2*) are based on guidance prescribed in HA207/07 Annex F: *1 µg/m^3 of NO_2 = 0.1kg N ha^{-1} yr^{-1}*.

The revised N-deposition values and impact of the proposed A5WTC at Tully Bog and throughout the length of the Proposed Scheme do not materially impact the conclusions made in the published ES with respect to ecological effects.

Dry Deposition

The assessment methodology prescribed by DMRB Vol 11, Section 3, Annex F – *Assessment of Designated Sites* (HA207/07) was followed as it represents the most accurate method for predicting road related effects on designated sites.

Dry N-deposition forms the focus of the DMRB assessment methodology. Wet N-deposition is not considered, given that it is dominated by chemical species with longer atmospheric residence times, which therefore are subject to longer range transport and are not considered locally attributable to the local roads. See quotation below from Air Pollution Information System (APIS);

"*Dry deposition of nitrogen oxides is greatest within large conurbations and close to major highways…*

…Wet deposition of reduced N comprises fine particulate ammonium (NH4+) salts or aerosols of acidic gases. These components have a relatively long atmospheric residence time, 4 to 15 days, and when removed by precipitation contribute to N deposition in remote ecosystems after long-range transport (Asman et al. 1998)."

Source: http://www.apis.ac.uk/overview/pollutants/overview_N_deposition.htm

Appendix 7: Statutory Consultee Agreement Communication

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Northern Ireland Environment Agency
www.daera-ni.gov.uk

Natural Environment Division
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast
BT7 2JA

Telephone: 028 9056 9812

Mr Seamus Keenan
DFI Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

Our Ref: DC/LJ A5

17 October 2017

Dear Mr Keenan,

Re: A5WTC Appropriate Assessment

NIEA CDP has considered the consultation on the Habitats Regulations Assessments (HRAs) relating to the proposed A5 Western Transport Corridor received on 24 August 2017 and discussed at a meeting held on 6 September 2017 and makes the following comments.

NIEA CDP previously queried drainage from the scheme, both during construction and operation, which will ultimately be to the River Foyle and Tributaries SAC/ASSI. The HRA documents reference a measure of 50 mg/l for total suspended solids to be placed on any discharge consent and that the Water Framework Directive measures will be incorporated. It is advised that the rationale and appropriateness of this value are explicitly included in the document given the status of the receiving water body as an SAC in part of spawning Atlantic salmon. The highest possible level of protection should be afforded to the SAC rivers and justification provided that no unnaturally high levels of suspended solids will be introduced.

The documents include proposed use of rip-rap constructed from gabion mattresses. Concerns previously raised surrounded the use in high energy rivers where there is a risk that structures can become damaged leading to loss of contents to the extent they can form fish traps leading to adverse effects on fish species including Atlantic salmon. Consideration of this has not been made. It is advisable that alternatives to gabion baskets should be investigated. Further to this, clarification should be provided regarding clear span bridges – if these are clear span then protective measures such as gabion baskets should not be required.

The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205 metres. Air quality modelling has been undertaken using ADMS Roads. All works associated with the appropriate section will be carried out within 500 metres of the SAC. The initial modelling indicated that nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was indicated as being an error in modelling and an explanation has been

provided. The rationale within this document should clearly explain the parameters which have affected the results given its public availability.

The current modelling indicates that deposition would be between 0.2 and 0.4% of the critical load for the site. In line with current policies NIEA CDP considers the modelled values to be insignificant.

If you require any further information please contact Lee Jones on the above number.

Yours sincerely,

Keith Finegan
Authorised Officer

Cc: Manny Gault - Client Project Manager - A5 WTC – (email)

Subject: FW: 2017-06-05_SI to DAHG_HRA Consultation

From: Manager Dau [mailto:Manager.Dau@chg.gov.ie]
Sent: 02 October 2017 12:02
To: Ireland, Stuart <Stuart.Ireland@wsp.com>
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Hi Stuart,

The Department has no further nature conservation comments in relation to the updated documents.

Kind regards,

Yvonne

Yvonne Nolan
Development Applications Unit
Department of Culture, Heritage, and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

(053) 9117382

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

From: Ireland, Stuart [mailto:Stuart.Ireland@wsp.com]
Sent: 02 October 2017 10:13
To: Manager Dau
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Dear Yvonne,

As you may be aware, the 3rd consultation on the A5 Western Transport Corridor, Habitats Regulations Assessments, closes today.

Could you please let me know if NPWS has any comments to make in realtion to the updated documents?

Kind regards,

Stuart

Stuart Ireland ***BSc (Hons) CEnv MCIEEM***
Associate

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Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

DfI Roads Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

08 November 2017

Dear Sir/Madam

RE: 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment.

Thank you for your recent correspondence in relation to the above-mentioned proposed development. The Loughs Agency is the statutory body charged with the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

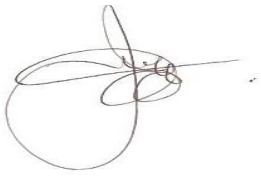
The Loughs Agency has considered the information provided in the 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment and would have no further comments at this stage.

Yours sincerely

22 Victoria Road, Prehen, Londonderry, BT47 2AB
Tel: 028 71 342100 Fax: 028 71 342720 Txt Phone: 028 71 318000
www.loughs-agency.org

Loughs Agency

Gníomhaireacht na Lochanna
Factrie fur Loughs



John McCartney
Director of Conservation & Protection

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A5 WTC
Western Transport Corridor

Department for Infrastructure
An Roinn Bonneagair
www.infrastructure-ni.gov.uk

wsp

HABITATS REGULATIONS ASSESSMENT SUMMARY REPORT

718736-3000-R-024
NOVEMBER 2017

PUBLIC

HABITATS REGULATIONS ASSESSMENT SUMMARY REPORT

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 718736
OUR REF. NO. 718736-3000-R-024

DATE: NOVEMBER 2017

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WSP.com

HABITATS REGULATIONS ASSESSMENT SUMMARY REPORT

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Date	18/10/2017			
Prepared by				
	Stuart Ireland			
Checked by				
	Paul Reid			
Authorised by				
	Peter Edwards			
Project number	718736			
Report number	718736-3000-R-024			
File reference	718736-3000-R-024			

CONTENTS

APPENDICES

1. INTRODUCTION

1.1. Background

1.1.1. WSP (formerly Mouchel) was commissioned to progress the design and development of the A5 Western Transport Corridor scheme. This included advice relating to the implications for Natura 2000 sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA) and, for the purposes of this report, Ramsar sites[1]).

1.1.2. The Habitats Directive (92/43/EEC), as implemented via The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended), requires that prior to determining an application for development consent for a project or plan, a competent authority must consider whether that project or plan would be likely to have a significant effect on any European site, either alone or in combination with other plans or projects. Where it is likely the project or plan would have a significant effect, the competent authority is required to undertake an appropriate assessment of the implications for the site taking into account the site's conservation objectives prior to determining the application for consent.

1.1.3. Following consultation with Department of Agriculture, Environment, and Rural Affairs (DAERA) Northern Ireland Environment Agency (NIEA) and National Parks & Wildlife Service (NPWS) in the Republic of Ireland ten sites were identified as ones which should be considered in accordance with the requirements of the Directive and Regulations:

- River Foyle and Tributaries SAC
- River Finn (Republic of Ireland) SAC
- Owenkillew River SAC
- Tully Bog SAC
- Lough Swilly (including former Inch Lough and Levels) SPA
- Lough Foyle SPA (Northern Ireland)
- Lough Foyle SPA (Republic of Ireland)
- Lough Neagh and Lough Beg SPA
- Lough Foyle Ramsar Site
- Lough Neagh & lough Beg Ramsar Site

1.1.4. To determine the level of the potential for the Proposed Scheme to have effects on these sites, it was necessary to undertake assessment of the issues to satisfy the requirements of Article 6 of the European Habitats Directive 92/43/EEC. Habitats Regulations Assessments (HRA) aim to do that, as part of a four-stage process. WSP has undertaken the first 2 stages of this process: Stage 1 – Screening is a test of likely significant impacts which assesses whether a plan or project may have an effect on the integrity of a Natura 2000 site; Stage 2 – Appropriate Assessment is undertaken where potential effects are identified at Stage 1 which cannot be ruled out on the basis of reasonable scientific certainty.

1.1.5. The information gathered and assessed has been presented in four reports:

- Report of Information to Inform an Appropriate Assessment – SAC Watercourses: covering the first three sites in the list above;
- Report of Information to Inform an Appropriate Assessment– Tully Bog SAC: covering the Tully Bog SAC;
- Report of Information to Inform an Appropriate Assessment– SPAs: covering the four SPA sites; and
- Report of Information to Inform an Appropriate Assessment – Ramsar Site Assessment Report: covering the Ramsar designated sites.

1.1.6. Each of these reports covers Stage 1 and Stage 2 of the assessment process, providing information on Screening for Likely Significant Effects and identifying issues which required consideration at Stage 2

[1] Ramsar sites are not referred to under the Directives or their transposition into UK and ROI Regulations. However, Planning Policy Statement 2 (PPS2) in Northern Ireland applies the same level of consideration and protection to them as to Natura 2000 sites.

Appropriate Assessment. The reports provide clear evidence for the potential effects, discuss appropriate mitigation committed to by DfI and provide a conclusion on the potential adverse effects on Natura 2000 sites, which may arise through the Proposed Scheme, either alone or in-combination, and thus make orders under the Roads (Northern Ireland) Order 1993.

1.1.7. In addition, in relation to the Natura 2000 sites potentially affected, the proposed scheme requires consent from a number of authorities which are charged with responsibility for aspects of the environment which could be affected by particular elements of the scheme. These comprise:

- Loughs Agency for Section 46 consents for works requiring taking material from freshwater riverbeds in the catchment covered by the Foyle Fisheries Act (Northern Ireland) 1952. Loughs Agency have completed environmental reports for each designated watercourse which requires works associated with the A5WTC scheme;
- DfI Rivers Schedule 6 consents for undertaking works to a watercourse, under the Drainage (Northern Ireland) Order (1973). The Schedule 6 process applies to discharges and works that would impact on the free flow of a watercourse. Article 45(3) of the Roads (Northern Ireland) Order includes the power for the Department to discharge water into any inland or tidal water. The Department, therefore, does not require consent from DfI Rivers under the Drainage (Northern Ireland) Order, however through consultation with DfI Rivers and the use of the Schedule 6 process a volumetric assessment of the proposed discharges has been completed. Schedule 6 consents have been granted 'in principle' for the proposed culvert and watercourse works and have considered the Report of Information to Inform an Appropriate Assessment (SAC Watercourses) prepared by WSP in complying with the Regulations;
- NIEA Water Management Unit (WMU) for consent to discharge water from the construction site to watercourses, under the Water (Northern Ireland) Order 1999. The WMU consents are required prior to construction commencing and once the contractor has designed and assessed his temporary works requirements on relation to temporary discharges from the works. These consents can only be applied for once the contractor has developed the construction programme and following consultation with WMU.

1.1.8. These authorities are accordingly required to conform to the requirements of the Directive and Regulations such that they comply with the HRA process prior to determining the applications and granting consent for that particular element(s) of the Scheme that affect the designated sites. The information and conclusions contained in the documents which form the subject of this report have been made available to the three authorities concerned in order that it can inform their decision making along with any other information which they consider should be taken into account.

1.2. Format of this report

1.2.1. This report provides a summary of the process undertaken throughout the HRA, and includes:

- Section 2 - a brief description of the Proposed Scheme;
- Section 3 - the consultation process (including comments received and actions taken);
- Section 4 - the findings of the Stage 1 screening;
- Section 5 - summary of the detailed assessments undertaken at Stage 2;
- Section 6 - a conclusion as to the likely significant effects of the Proposed Scheme on Natura 2000 sites.

2. THE PROPOSED SCHEME

2.1.1. The Proposed Scheme will be a designated Key Transport Corridor and a component of the Regional Strategic Transport Network, with an overarching aim to improve links between the urban centres in the west of Northern Ireland and to provide a strategic link with international gateways. It is strategically aligned with several central and local government plans and policies, which all demonstrate a strong ambition to improve the A5 as a key national and local link.

2.1.2. There are specific problems which the Proposed Scheme is designed to address, namely congestion at pinch points and journey time unreliability; accessibility to key economic centres and international gateways; accident hotspots; community severance; and poor air quality. From these, four key objectives have been created to:

- improve road safety;
- improve the road network in the west of the Province and north / south links;
- reduce journey travel times; and
- provide increased overtaking opportunities along the A5 Western Transport Corridor.

2.1.3. The final proposals have been developed in light of safety, economic, environmental, integration and accessibility considerations.

2.1.4. The proposed new A5WTC dual carriageway runs for some 85km between the existing A5 north of New Buildings and the existing A5 south of Aughnacloy. The proposal connects to the national primary road network in the Republic of Ireland at 2 locations, the N14/N15 roads at Strabane/Lifford into Co. Donegal and the N2 at Aughnacloy into Co. Monaghan. Donegal County Council are promoting a new road which connects the A5WTC to the N15 just south of Lifford and this connectivity has been developed in co-operation with the A5WTC project team. These proposals have been progressed through the statutory process and the decision to proceed will be confirmed so that construction and opening to traffic coincides with the opening of the A5WTC around Strabane. This scheme crosses the River Finn SAC and the proposals have been subject to HRA within the Republic and considered under the cumulative effects section of the WSP report. Proposals to upgrade the N2 are currently on hold and any impacts on the A5WTC at the border in Co. Monaghan cannot be assessed at this point in time, though this location nor the consequences of change at this location are considered as not affecting any of the Natura 2000 sites considered in these Reports.

2.1.5. It is anticipated the construction of the proposed scheme will be undertaken in three phases as follows, and shown in Appendix A:

- Phase 1a: Junctions 1-3 (New Buildings – north of Strabane) and Phase 1b: Junctions 13-15 (south of Omagh – A4,Ballygawley) between 2017 and 2019;
- Phase 2: Junctions 3-13 (north of Strabane – south of Omagh) between 2021 and 2023; and
- Phase 3: Junction 15 (A4,Ballygawley) to the A5 south of Aughnacloy between 2026 and 2028.

2.1.6. The currently proposed A5WTC Scheme substantially reflects a previous proposal which was promoted in 2010 and for which an Environmental Statement (A5WTC ES 2010) was prepared and published. The environmental studies reported in the A5WTC ES 2010 were informed by a draft Habitats Regulations Assessment (HRA) which recognised and screened the above European Designated Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for likely significant effects. In September 2012 a legal challenge was brought against the Minister's decision to proceed with the Scheme.

2.1.7. Legal proceedings culminated in March 2013 with Judge Stephens advising that he was minded to quash the decision of the Minister on the basis that an appropriate assessment under the Habitats Directive ought to have, but was not carried out on the River Foyle and River Finn Special Areas of Conservation. At a further hearing in April 2013 the Minister's decision to make the Direction Order and Vesting Order was quashed.

2.1.8. Rather than appeal the judgement, the Department decided to complete the Habitats Regulations process. In doing so, and recognising the time to complete this process, the Department also decided to update the Proposed Scheme in light of the changes in design standards, legislation and the local environment whilst incorporating the recommendations from the Inspectors at the 2011 Public Inquiries.

2.1.9. A new Environmental Statement (ES) and draft Statutory Orders were published in February 2016 with the Planning Appeals Commission (PAC) appointed to administer the Public Inquiry process. The PAC was not

commissioned to hear evidence on the HRA but as there is common data and assessment between the ES and HRA reports, aspects of the assessment were presented to the Commissioners as they related to the ES. WSP have taken any relevant issues raised through the Public Inquiry process into account in preparing the Reports of Information to Inform an Appropriate Assessment (RIAA) documents.

3. CONSULTATION

3.1. Introduction

3.1.1. Throughout the assessment process DfI and WSP have discussed the assessment process and content with NIEA and Loughs Agency as the main statutory consultees relevant to the Proposed Scheme and its potential effects on Natura 2000 sites.

3.1.2. To ensure a robust and open process has been followed DfI has undertaken three rounds of consultations enabling consultees to examine emerging documents and provide comment on the content and draft conclusions reached in each.

3.1.3. The comments received during each consultation have been included in subsequent reports for further comment, thus enabling DfI and WSP to refine mitigation and ensure robust and detailed assessments are provided to the Competent Authority for the Appropriate Assessment.

3.2. 1st Consultation Draft

3.2.1. During 2014, a first round of consultation draft Reports of Information to Inform an Appropriate Assessment (RIAA) was published. These detailed the ongoing assessments, and initial conclusions reached during the Stage 1 Screening process, and ongoing Stage 2 detailed assessments.

3.2.2. These draft documents were provided to statutory consultees (NIEA, NPWS and Loughs Agency) as well as Inland Fisheries and the Royal Society for the Protection of Birds (RSPB) and were made available to the general public. The consultation was advertised in the press and on the websites of the Department and project (www.a5wtc.com). The documents were placed on deposit at 10 locations (in the vicinity of the scheme) as well as one in each of Counties Donegal and Monaghan in the Republic of Ireland. The documents were also available to download from the project website.

3.2.3. Responses were received from statutory consultees and members of the public (See Appendix B). Following the consultation DfI and WSP completed surveys, undertook further assessment, and in the case of Tully Bog SAC, undertook a redesign of flood compensation related to the Proposed Scheme to avoid a potential ground water drainage effect arising.

3.2.4. The changes were also included in the 2016 Environmental Statement and reflected, where necessary, in the draft vesting orders.

3.3. 2nd Consultation Draft

3.3.1. In March 2017, DfI published a second draft of the Reports of Information to Inform RIAAs which took account of relevant comments received from statutory and other consultees as well as any issues raised at the Public Inquiry for the proposed Scheme held between October and December 2016.

3.3.2. These documents were provided to statutory consultees (NIEA, NPWS and Loughs Agency) as well as Inland Fisheries and the RSPB and were made available to the general public using the same process described in para 3.2.2 above.

3.3.3. Responses were received to this consultation from several interested parties (See Appendix B). Following this consultation DfI and WSP refined the assessments further.

3.4. 3rd Consultation Draft

3.4.1. In August 2017, DfI published a 3rd and final consultation draft of the RIAAs. Comments received during the 2nd consultation were incorporated into the amended documents as appropriate. To ensure ease of comparison on this occasion a table of changes was added to each document.

3.4.2. This consultation once more requested comment from statutory and non-statutory consultees, including the general public, again published in the press and using the same process described in para 3.2.2. The Department also wrote to or emailed all parties that responded to the second consultation notifying them that a 3rd consultation was to take place.

The final consultation closed on 4th October 2017. A limited number of responses were received; see Appendix B.

Communications received from Statutory Consultees (NIEA, NPWS and Loughs Agency) providing confirmation of their agreement with the findings of the assessments is provided in Appendix C.

4. STAGE 1 - SCREENING

4.1. Introduction

4.1.1. Stage 1 – Screening was undertaken in 2010 for all Natura 2000 sites (including Ramsar sites) which the statutory consultees identified as being potentially affected by the Proposed Scheme. The screening was re-visited in 2014 prior to publication of draft Reports of Information to Inform an Appropriate Assessment.

4.1.2. The screening assessed whether the Proposed Scheme, either alone or in-combination with other proposals, would be likely to have a significant impact on the integrity of the designated sites. In accordance with case law, the approach used the precautionary principle to ensure that any potential effects would be captured and assessed in light of the conservation objectives of each site.

4.2. SAC Watercourses

4.2.1. The test of likely significance/screening identified the following potential effects:

- Loss of habitat identified as a primary reason for selection of the SACs or as qualifying features;
- Disturbance or harm to Atlantic salmon;
- Disturbance or harm to freshwater pearl mussel; and
- Disturbance or harm to otter.

4.3. Tully Bog SAC

4.3.1. The test of likely significance/screening identified the following potential effects:

- Degradation of the qualifying habitats through airborne pollution; and
- Degradation of the qualifying habitats through changes to the hydrological regime.

4.4. SPAs

4.4.1. The test of likely significance/screening identified the following potential effects:

- Loss of feeding habitat (functional habitat)2 at Dunnalong/Thorn Hill and Grange Foyle outside of the SPAs but which is used by wintering birds associated with the four SPAs; and
- Disturbance of wintering birds associated with the four SPAs during their use of feeding habitat outside of the SPAs at Dunnalong/Thorn Hill and Grange Foyle.

4.5. Ramsar Sites

4.5.1. The test of likely significance/screening identified the following potential effects:

- Loss of feeding habitat (functional habitat) at Dunnalong/Thorn Hill and Grange Foyle outside of the Ramsar Sites but which is used by wintering birds associated with the Ramsar Sites;
- Disturbance of wintering birds associated with the Ramsar Sites during their use of feeding habitat outside of the Ramsar Sites at Dunnalong/Thorn Hill and Grange Foyle; and
- Disturbance or harm to Atlantic salmon and sea lamprey.

[2] Habitat outside of a designated site which is used / relied on by species associated with the designated site.

4.6. Conclusion of Test of Likely Significance/Screening

In light of the data presented at the screening stage, it was determined that sufficient uncertainty remained regarding the potential effects of the above factors for the assessment to proceed to Stage 2.

5. STAGE 2 - APPROPRIATE ASSESSMENT

5.1. Introduction

5.1.1. In light of the finding of the screenings in 2014 it was determined that the HRAs should proceed to Stage 2 Appropriate Assessment.

5.1.2. DfI and WSP reviewed available data sources, and undertook specific surveys/consultations to gather sufficient data to inform robust assessments of the potential effects of the Proposed Scheme, alone or in-combination with other proposals, on the integrity of the identified Natura 2000 sites, taking into account the published Conservation Objectives for the sites.

5.1.3. The following sections provide a summary of the potential effects identified for each of the Natura 2000 sites, mitigation identified and the assessment of adverse effects on site integrity.

5.2. SAC Watercourses

Loss of Habitat Identified as a Primary Reason For Selection of the SACs or as Qualifying Features

5.2.1. Loss of such habitat was identified as either direct, through habitat removal during construction, or indirect, through damage caused by release of pollutants such as sediment during construction or operation of the scheme.

5.2.2. Direct loss will be limited to 0.05ha of bankside habitat within the River Foyle & tributaries SAC. The habitat lost will not be *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation which is cited as a primary reason for selection of the SAC such that no mitigation will be required for this habitat loss to preserve the integrity of the SAC.

5.2.3. Potential for indirect loss of habitat during construction will again be limited to the River Foyle & tributaries SAC. Mitigation will be applied through control of construction works through a stringent Construction Environmental Management Plan, Silt Management Plan and adherence to Pollution Prevention Guidance. Effectiveness of the mitigation will be monitored by implementation of an adaptive monitoring plan. This will have conservative thresholds set and intensively monitored throughout construction.

5.2.4. Potential for indirect loss of habitat during operation of the road will be limited to the River Foyle & tributaries SAC and River Finn SAC. Design of the road drainage system has used modern treatment methods, including Sustainable Drainage System (SuDS) design elements, such as retention ponds and grass swales. All outfalls from the Proposed Scheme pass the Highways Agency Water Risk Assessment Tool assessment (appropriately adjusted for discharge into a Natura 200 site) for all potential pollutants, including sediment.

5.2.5. The potential for an accidental spillage from the carriageway during operation of the road has been assessed, and shown to be 1:500 for a single drainage catchment in any year, and 1:1000 for an incident on more than one catchment in a single year. Pollution control penstock valves, identified by marker posts as pollution control valves, will be fitted at the termination chamber of mainline drainage runs and in advance of discharges to ponds, wetlands or watercourses.

5.2.6. The potential for shade created by features of the Proposed Scheme to damage qualifying habitat is negligible and not significant.

Disturbance or Harm to Atlantic Salmon

5.2.7. The introduction of the Proposed Scheme into the catchments of the designated sites has the potential to cause harm to Atlantic salmon in the following ways:

- Disturbance or harm associated with construction related noise, vibration and lighting within the SACs and wider catchments;
- Disturbance or harm associated with the construction of bridges, culverts, watercourse diversions and drainage outfalls and other locations where working areas including site compounds will be within 50m of watercourses in the SACs and within the wider catchments;
- Loss of habitat relied on by the species within the SACs and wider catchments;

- Fragmentation as a result of obstruction or prevention of passage for the species along watercourses in the SACs and within the wider catchments once the proposed scheme is open to use;
- Harm to the population of the species associated with the SACs as a result of increased concentrations of Total Suspended Sediment (TSS) and other harmful substances in watercourses associated with discharges from drainage outfalls for the proposed scheme; and
- Disturbance during use as a result of road related lighting.

5.2.8. The existing road network provides little or no treatment to run-off from the road surface. The implementation of the Proposed Scheme, with a modern road drainage network, which will take a large proportion of the traffic from the existing A5 onto the new dual carriageway will result in improved water quality.

5.2.9. Outfalls into reaches with identified nursery or spawning habitat will have measures included in their design to reduce flow to a velocity which safeguards salmonids in consultation with NIEA, NPWS and Loughs Agency.

5.2.10. Control of construction works through implementation of stringent pollution control measures and measures to control noise, vibration and light pollution during construction, combined with measures agreed with Loughs Agency for timing and control of construction works, appropriate design of culverts to avoid obstructions to passage for fish, and reinstatement of high quality habitats up and downstream of culverts and along watercourse diversions, appropriate drainage design for the operational phase of the road, and minimised use of appropriately designed lighting reduce the potential effects of the Proposed Scheme. These measures will be monitored by the Department during construction and enforced through contractual obligations (in particular the CEMP and SMP).

Disturbance or Harm to Freshwater Pearl Mussel

5.2.11. No direct effects on freshwater pearl mussel will arise from construction or operation of the Proposed Scheme.

5.2.12. The potential for reduction in fish species, on which the freshwater pearl mussel lifecycle is dependent, are controlled and reduced through the measures summarised in the preceding section of this report.

Disturbance or Harm to Otter

5.2.13. The construction and presence of the Proposed Scheme has been determined to have the following potential effects on otter:

- Disturbance and harm as a result of construction;
- Loss of habitat and a reduction in available food resources;
- Fragmentation associated with obstruction of existing access along watercourses resulting in potential mortality or harm where otters seek to cross carriageways; and
- Deterioration in water quality resulting in harm to the species and consequent impacts on supporting habitat.

5.2.14. Strict control of construction works, following measures outlined above, and the adherence to mitigation strategies agreed with NIEA will appropriately mitigate for construction activities and the potential for reduction of available food resource. Habitat loss has been identified as not significant in the context of the otter home ranges. These measures will be enforced through contractual obligations, and oversight from the Department during construction.

5.2.15. Inclusion of otter passes at culvert locations will remove potential for fragmentation of habitat.

5.2.16. The potential for deterioration in water quality will be removed through the control of construction works, as detailed above, and through the appropriate design of the road drainage network.

5.3. Tully Bog SAC

Degradation of the Qualifying Habitats through Airborne Pollution

5.3.1. The potential for airborne pollutants from construction and operation of the road scheme have been investigated. Application and monitoring of stringent construction controls in the vicinity of Tully Bog SAC will ensure dust arising from the construction works does not have a significant adverse effect on the bog. These measures will be enforced through contractual obligations, and oversight from the Department during construction.

5.3.2. Modelling has determined that potential contributions of oxides of nitrogen (N), and N deposition within Tully Bog SAC will rise marginally with the Proposed Scheme in place.

5.3.3. Background deposition for Nitrogen is taken from the Air Pollution Information System (APIS[3]), and reports average rates for 2013-2015 for the 5km grid square containing Tully Bog SAC. Nitrogen deposition rates are quoted as:

- Minimum 20.44 kg N/ha/y
- Maximum 23.66 kg N/ha/y
- Average 21.13 kg N/ha/y

5.3.4. The modelling shows that by 2028 (opening of Phase 3 of the Proposed Scheme) N deposition could rise by 0.2 to 0.4% of the United Nations Economic Commission for Europe (UNECE) lower critical load (5 kg N/ha/y) (when compared to modelled levels without the Proposed Scheme) at the fringes of the bog. Further modelling has demonstrated that by 2088 this level may increase slightly, but will still be significantly below 1% of the lower critical load of N deposition.

5.3.5. Current Conservation Objectives for Tully Bog SAC aim to reduce N-deposition rates to between 5 and 10kgN/ha/y. The current NOx deposition rates are predicted to reduce by approximately 19.4 to 19.8% of the current average deposition rate (21.13 kg/ha/yr) without the Scheme in place, by 2028. With the Proposed Scheme the reduction in N deposition rate will be marginally less, being 19.3% to 19.7% of the current average over this same time. Hence the impact of the Proposed Scheme will result in an additional N deposition rate of 0.11% to 0.12% over and above the existing rate, which will have a *de minimis* effect on the potential of the bog to reach its Conservation Objective.

5.3.6. Modelling has shown that all predicted levels of oxides of N will remain significantly below the threshold set by the EU of 30 µg/m^3.

5.3.7. Ammonia is known to form a smaller contribution to atmospheric N deposition from roads than oxides of N. The contribution of ammonia with the Proposed Scheme in place will not increase, and thus, as the contribution of N deposition from the Proposed Scheme is not considered significant, ammonia produced by the Proposed Scheme is also not considered to be a significant adverse effect.

5.3.8. Consideration has been given to the potential effects of emissions from the Proposed Scheme on bryophytes. Surveys have shown that no evidence of N toxicity on bryophytes is currently present within the bog, and as N deposition levels will fall with or without the Proposed Scheme, it is concluded that the A5WTC will not have an adverse effect on this species group.

5.3.9. Therefore, the Proposed Scheme is not considered to have an adverse effect on the integrity of the SAC.

5.3.10. The potential use of barriers to reduce atmospheric contribution of N deposition arising from the Proposed Scheme was investigated. However, as barriers are only effective when placed close to the source of emissions, and only for a short distance downwind of the barrier, the separation of the A5WTC from the SAC of over 200m means that no significant reduction in N deposition would accrue through the inclusion of such a structure. Given the insignificant levels of N deposition increase arising from the Proposed Scheme, and the ineffectiveness of barriers in reducing this further, it is not intended that barriers should be introduced.

5.3.11. Bog systems which have a low water table are more sensitive to N-deposition, (which is why the lower critical load has been used to calculate increase percentages for this project (http://www.apis.ac.uk/guidance-applying-critical-load-range-atmospheric-nitrogen-deposition-bog-habitats-uk). Therefore, DfI will implement one of the following approaches to mitigate the *de minimis* increase in N-deposition by raising the water table, reducing the sensitivity of the bog to N-deposition and improving the conservation status of the site (Rochefort et al 1995, Smolders et al 2003, Howie et al 1998, Malterer et al 1998, Money 1995, Morgan-Jones et al 2005):

- Enter into agreements with the landholders to block drains and stop drainage from the bog; or
- If the above is not acceptable to any of the landowners, DfI will purchase by agreement or vest the applicable areas of the SAC and undertake the work.

5.3.12. Four proposals which may have an air quality impact on Tully Bog were recorded. The potential contribution to N deposition is calculated from information available on the planning portal. Thus in-combination effects are a

[3] www.apis.ac.uk

total N-deposition contribution of approximately 0.34 to 0.35% over and above the existing rate (1.17% of the lower critical load). This contribution is *de minimis* and not significant in relation to the integrity of the bog or its conservation objectives.

Degradation of the Qualifying Habitats through Changes to Hydrological Regime

5.3.13. Consideration has been given to the potential for the Proposed Scheme to alter the local hydrological regime, and thus possibly increase drying out of the bog by increasing drainage, or by intercepting ground water flowing into the bog.

5.3.14. A redesign of proposed flood compensation storage to move it further from the bog, and to the other side of a watercourse has removed any potential for adverse effects occurring from this element of the works.

5.3.15. The topography of the area and construction methods selected means that the proposed construction will not have more than a temporary, localised effect on hydrology, and that temporary, localised effect would be a reduction in flow away from the bog.

5.3.16. It has therefore been concluded that the Proposed Scheme will not have an adverse effect on the hydrology of the SAC.

5.4. SPA

Loss of Feeding Habitat (Functional Habitat) at Dunnalong/Thorn Hill and Grange Foyle Outside of the SPAs and which is used by Wintering Birds associated with the four SPAs

5.4.1. Studies have indicated that there are two core areas for wintering swan and goose foraging within the Foyle floodplain. An approximate total of 1200ha of available foraging habitat has been identified. The Proposed Scheme will require loss of approximately 40ha of the available foraging land, equating to 3% of the habitat available.

5.4.2. However, as none of the land lost to the Proposed Scheme is within the core foraging areas, and no swans or geese have been recorded in the areas to be lost during the studies associated with the Proposed Scheme, it is considered that habitat loss will not have an adverse effect on the SPAs.

Disturbance of Wintering Birds associated with the four SAPs during their use of Feeding Habitat outside of the SPAs at Dunnalong/Thorn Hill and Grange Foyle

5.4.3. There is potential for construction works to cause disturbance to feeding swans and geese. Studies published in scientific literature have been undertaken which quantify the distances at which birds become disturbed by vehicles and people, other studies have investigated the disturbing effects of noise on such species. Mitigation proposals summarised below are based upon the relevant conclusions of these studies.

5.4.4. Mitigation proposed includes limiting working hours between chainage 5000 and chainage 10500, during winter, and the use of an Ornithological Clerk of Works (OCoW) to monitor swan and goose behaviour during works. Controls on potentially disturbing activities, such as rock breaking and piling have been detailed in the draft Construction Environmental Management Plan (CEMP) and within the RIAA. Works will not be allowed to commence within 250m of grazing or roosting Whooper swans or Greylag geese. Should significant disturbance of feeding swans or geese be recorded by the OCoW, work will be suspended in the vicinity of the birds until they have moved outside of the zone of influence of the construction activity.

5.4.5. With the proposed mitigation in place, it is considered that there will be no adverse effect on wintering swan and goose populations using the Foyle floodplain for foraging, and thus no adverse effect on the SPAs.

5.5. Ramsar Sites

Loss of Feeding Habitat (Functional Habitat) at Dunnalong/Thorn Hill and Grange Foyle Outside of the Ramsar Sites And Which Is Used By Wintering Birds associated with the Ramsar Sites

5.5.1. The potential effects are discussed in section 5.4.1 and 5.4.2 above.

5.5.2. As none of the land lost to the Proposed Scheme is within the core foraging areas, and no swans or geese have been recorded in the areas to be lost during the studies associated with the Proposed Scheme, it is considered that habitat loss will not have an adverse effect on the Ramsar sites.

Disturbance of Wintering Birds associated with the Ramsar Sites during their use of Feeding Habitat outside of the Ramsar Sites at Dunnalong/Thorn Hill and Grange Foyle

5.5.3. The potential effects are discussed in section 5.4.3 to 5.4.5 above.

5.5.4. With the proposed mitigation in place, it is considered that there will be no adverse effect on wintering swan and goose populations using the Foyle floodplain for foraging, and thus no adverse effect on the Ramsar sites.

Disturbance or Harm to Atlantic Salmon and Sea Lamprey

5.5.5. The potential effects are discussed in section 5.2.7 and 5.2.8 above.

5.5.6. As for the SAC Watercourse sites, with the mitigation in place, the Proposed Scheme will not have an adverse effect on the integrity of the Natura 2000 sites.

5.6. Assessment of Adverse Effects on Site Integrity

5.6.1. Once potential impacts were identified, they were considered in relation to the potential to have an adverse effect on the integrity of the designated sites. The assessment determined whether there is likely to be:

- A reduction in the coherence of the ecological structure or function of the site, taking into account the whole area of the site, and supporting habitats which are integral to the structure and function of the site, and
- Whether any such reduction would reduce the ability of the site to sustain the qualifying habitat and/or the levels of populations of the species for which it was classified.
-

5.6.2. The DMRB guidance (HD 44/09) provides a suitable checklist to identify interactions and potential effects on the integrity of the site. Completed checklists are provided in the appendices of the final RIAA and Ramsar Site reports.

5.6.3. The definition for integrity adopted in this report is that provided in ODPM Circular 06/2005 and Defra Circular 01/2005 - Biodiversity and Geological conservation – Statutory obligations and their impact within the planning system, which defines integrity in the context of designated site as:

The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

6. CONCLUSION

6.1. RIAA Conclusions

6.1.1. As outlined, each of the issues has been thoroughly addressed and the scientific information provided has proved beyond reasonable doubt that:

SAC Watercourses

6.1.2. Loss of qualifying habitat – no significant direct loss will occur, and for indirect loss mitigation is appropriately and robustly identified such that no adverse effect on site integrity will occur.

6.1.3. Disturbance or harm to Atlantic salmon – mitigation through design and construction control measures is appropriately and robustly identified such that no adverse effect on site integrity will occur.

6.1.4. Disturbance or harm to freshwater pearl mussel – no direct adverse effect will occur, and measures to protect fish species are appropriate and robust such that no adverse effect on site integrity will occur.

6.1.5. Disturbance or harm to otter - mitigation through design and construction control measures is appropriately and robustly identified such that no adverse effect on site integrity will occur.

Tully Bog SAC

6.1.6. Degradation of qualifying habitats through airborne pollution – no adverse effects on the integrity of the site will occur.

6.1.7. Degradation of qualifying habitats through alteration in hydrology - no adverse effects on the integrity of the site will occur.

SPA

6.1.8. Loss of functional habitat – no adverse effects on the integrity of the site will occur.

6.1.9. Disturbance of swans and geese using functional habitat – mitigation measures are appropriate and robust, such that no adverse effects on the integrity of the site will occur.

Ramsar Sites

6.1.10. Loss of functional habitat – no adverse effects on the integrity of the site will occur.

6.1.11. Disturbance of Wintering Birds (Whooper swans and Greylag geese) using functional habitat – mitigation measures are appropriate and robust, such that no adverse effects on the integrity of the site will occur.

6.1.12. Disturbance or harm to Atlantic salmon and/or sea lamprey - mitigation measures are appropriate and robust, such that no adverse effects on the integrity of the site will occur.

In-Combination Effects

6.1.13. Examination of extant proposals has determined that for each of the Natura 2000 sites being assessed there are no cumulative effects anticipated.

6.2. Assessment Conclusion

6.2.1. In conclusion, having regard to the Environmental Statement, the RIAAs, and the consultation responses to these assessments, the likely significant environmental effects of the proposed scheme have been assessed and information presented is sufficient to inform judgements to be reached with regard to the scheme.

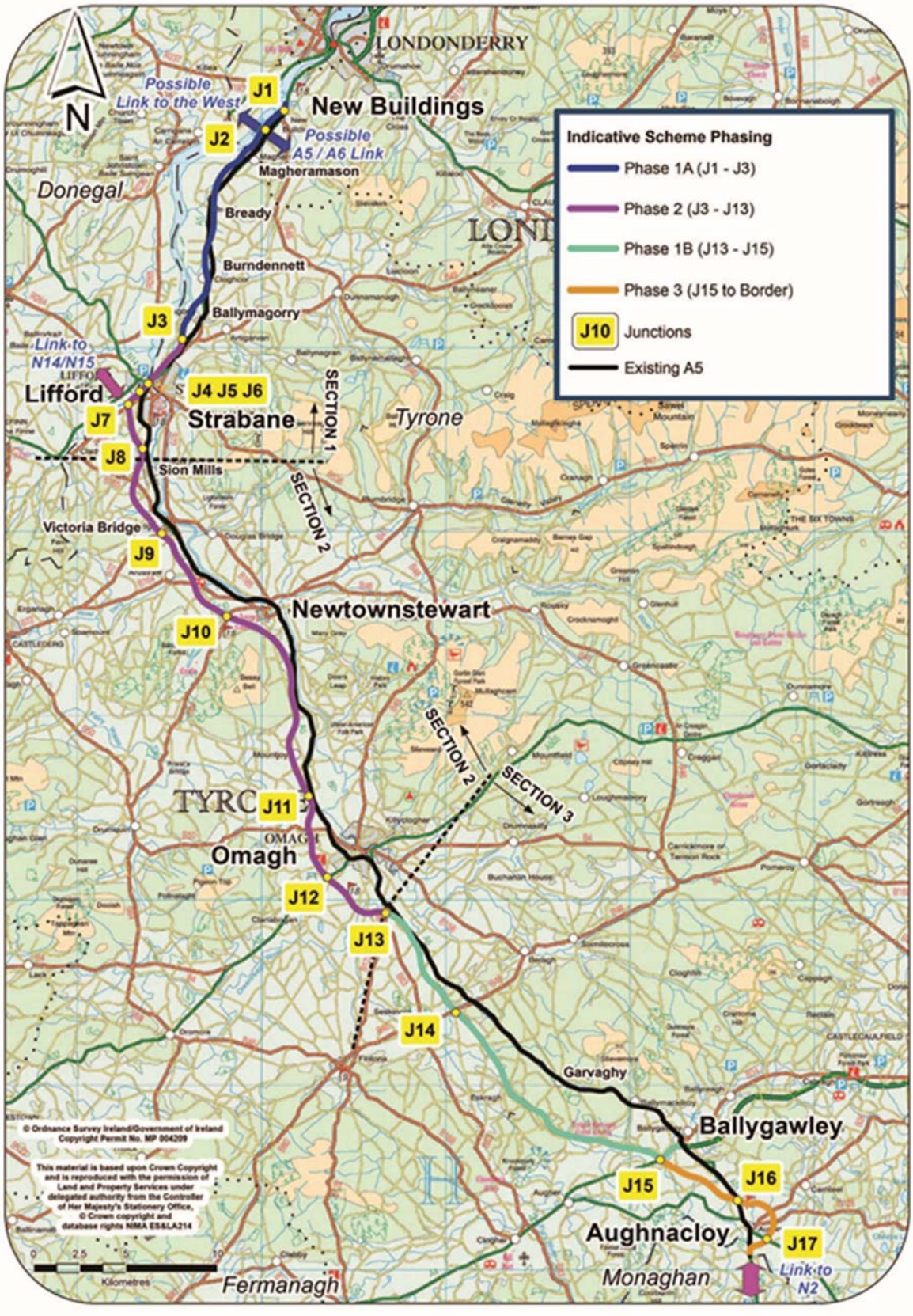
6.2.2. In addition, the relevant consenting authorities have or will have to comply with relevant legislation prior to granting consents for works which are controlled by separate legislation.

6.2.3. Accordingly, the construction and operation of the A5 WTC would not by itself, or in combination with other known plans or projects, adversely affect the integrity of Natura 2000 sites.

Appendix A

FIGURES

CONSTRUCTION PHASING (FOR ASSESSMENT PURPOSES)



Appendix B

CONSULTATION

In exercising its functions under this legislation, the Department sought the opinion of Statutory Consultees (NIEA, NPWS and Loughs Agency), other interested parties (including Inland Fisheries and RSPB) and the general Public in April 2014 on three draft Reports of Information to Inform an Appropriate Assessment (RIAAS) on the Natura 2000 sites as below:

- Lough Foyle and Lough Neagh & Lough Beg Ramsar Sites
- SAC Watercourses (River Foyle and Tributaries, River Finn and Owenkillew River SACs)
- Lough Foyle SPA, Lough Swilly SPA and Lough Neagh & Lough Beg SPA

In addition, the Department sought the opinion of Statutory Consultees (NIEA, NPWS and Loughs Agency), other interested parties (including Inland Fisheries and RSPB) and the general Public in in October 2014 on the RIAA for;

- Tully Bog Special Area of Conservation

Responses in relation to these consultation periods are outlined in Table B1 below.

Table B1 – 1st Draft Consultation Summary

1st Draft Consultation April and October 2014						
Northern Ireland Environment Agency	07/07/2014 - Consultation Response Received	28/11/2014 - Consultation Response Received	08/07/2015 - Response Issued	11/11/2015 - Response Issued	15/01/2016 - Consultation Response Received	21/01/2016 - Acknowledgement Letter Issued
National Parks and Wildlife Service	18/08/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Loughs Agency	13/08/2014 - Consultation Response Received	11/11/2015 - Response Issued				
Inland Fisheries	16/05/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Irish Central Border Area Network	13/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				

1st Draft Consultation April and October 2014						
A5 Working Group	13/06/2014 - Consultation Response Received	21/11/2014 - Consultation Response Received	08/07/2015 - Response Issued			
Royal Society for the Protection of Birds	24/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Alternative A5 Alliance C&J Blacks Solicitors Corvus Consulting and Roger Watts	13/06/2014 - Consultation Response Received	28/11/2014 - Consultation Response Received	08/07/2015 - Response Issued	24/11/2016 - Consultation Response Received		
Alternative A5 Alliance Dr Ken Perry	07/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Ulster Angling Federation	12/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Dorothy Love	11/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Action for A5 - Pat Darcy	12/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Peter McCarron	13/06/2014 - Consultation Response Received	08/07/2015 - Response Issued				
Kathleen Christie	10/07/2014 - Consultation Response Received	28/11/2014 - Consultation Response Received	08/07/2015 - Response Issued			

Following on from the initial consultation exercise during April and October 2014 outlined in Table B1 above, the Department undertook a 2nd draft consultation period on the four updated draft RIAAs in April 2017. Responses in relation to this consultation period are outlined in Table B2 below.

Table B2 – 2nd Draft Consultation Summary

2nd Draft Consultation April 2017						
Northern Ireland Environment Agency	13/04/2017 Notification of 2nd Draft Consultation Issued	13/06/2017 - Consultation Response Received	24/08/2017 - Response and Notification of 3rd Draft Consultation Issued			
National Parks and Wildlife Service	13/04/2017 Notification of 2nd Draft Consultation Issued	06/06/2017 - Consultation Response Received	24/08/2017 - Response and Notification of 3rd Draft Consultation Issued			
Loughs Agency	13/04/2017 Notification of 2nd Draft Consultation Issued	15/06/2017 - Consultation Response Received	24/08/2017 - Response and Notification of 3rd Draft Consultation Issued	08/09/2015 - Response Issued		
Inland Fisheries	13/04/2017 Notification of 2nd Draft Consultation Issued	09/05/2017 - Consultation Response Received	31/08/2017 - Response and Notification of 3rd Draft Consultation Issued			
Irish Central Border Area Network	13/04/2017 Notification of 2nd Draft Consultation Issued					
A5 Working Group	13/04/2017 Notification of 2nd Draft Consultation Issued					

2nd Draft Consultation April 2017						
Royal Society for the Protection of Birds	13/04/2017 Notification of 2nd Draft Consultation Issued	28/06/2017 - Consultation Response Received	24/08/2017 - Response and Notification of 3rd Draft Consultation Issued			
Alternative A5 Alliance C&J Blacks Solicitors Corvus Consulting and Roger Watts	13/04/2017 Notification of 2nd Draft Consultation Issued	17/05/2017 - Consultation Response Received	07/09/2017 - Response Issued	07/07/2017 - Consultation Response Received	10/07/2017 - Acknowledgement Letter Issued	02/08/2017 - Response Issued
Alternative A5 Alliance Dr Ken Perry	13/04/2017 Notification of 2nd Draft Consultation Issued					
Ulster Angling Federation	13/04/2017 Notification of 2nd Draft Consultation Issued					
Dorothy Love	13/04/2017 Notification of 2nd Draft Consultation Issued					
Action for A5 - Pat Darcy	13/04/2017 Notification of 2nd Draft Consultation Issued					
Peter McCarron	13/04/2017 Notification of 2nd Draft Consultation Issued					
Kathleen Christie	13/04/2017 Notification of 2nd Draft Consultation Issued	30/05/2017 - Consultation Response Received	02/06/2017 - Acknowledgement Letter Issued	31/08/17 - Response and Notification of 3rd Draft Consultation Issued		

The Department undertook a 3rd draft consultation period on the four updated draft RIAAs in August 2017. Responses in relation to this consultation period are outlined in Table B3 below.

Table B3 – 3rd Draft Consultation Summary

3rd Draft Consultation October 2017				
Northern Ireland Environment Agency	17/10/2017 - Consultation Response Received			
National Parks and Wildlife Service	02/10/2017 - Consultation Response Received			
Loughs Agency	08/11/2017 – Consultation Response Received			
Department for Infrastructure Rivers	02/10/2017 - Consultation Response Received	17/11/2017 Consultation Response Received		
Inland Fisheries	11/09/2017 - Consultation Response Received Confirmation of No Comments			
Royal Society for the Protection of Birds	08/09/2015 - Response Issued	05/10/2017 - Consultation Response Received		
Northern Ireland Environment Agency – Water Management Unit	14/11/2017 – Consultation Response Received			
Alternative A5 Alliance C&J Blacks Solicitors Corvus Consulting and Roger Watts	02/10/2017 - Consultation Response Received	11/10/2017 - Response Issued	26/10/2017 - Consultation Response Received	
Kathleen Christie	03/10/2017 - Consultation Response Received			

Appendix C

COMMUNICATION RECEIVED

Northern Ireland Environment Agency
www.daera-ni.gov.uk

Natural Environment Division
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast
BT7 2JA

Telephone: 028 9056 9812

Mr Seamus Keenan
DFI Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

Our Ref: DC/LJ A5

17 October 2017

Dear Mr Keenan,

Re: A5WTC Appropriate Assessment

NIEA CDP has considered the consultation on the Habitats Regulations Assessments (HRAs) relating to the proposed A5 Western Transport Corridor received on 24 August 2017 and discussed at a meeting held on 6 September 2017 and makes the following comments.

NIEA CDP previously queried drainage from the scheme, both during construction and operation, which will ultimately be to the River Foyle and Tributaries SAC/ASSI. The HRA documents reference a measure of 50 mg/l for total suspended solids to be placed on any discharge consent and that the Water Framework Directive measures will be incorporated. It is advised that the rationale and appropriateness of this value are explicitly included in the document given the status of the receiving water body as an SAC in part of spawning Atlantic salmon. The highest possible level of protection should be afforded to the SAC rivers and justification provided that no unnaturally high levels of suspended solids will be introduced.

The documents include proposed use of rip-rap constructed from gabion mattresses. Concerns previously raised surrounded the use in high energy rivers where there is a risk that structures can become damaged leading to loss of contents to the extent they can form fish traps leading to adverse effects on fish species including Atlantic salmon. Consideration of this has not been made. It is advisable that alternatives to gabion baskets should be investigated. Further to this, clarification should be provided regarding clear span bridges – if these are clear span then protective measures such as gabion baskets should not be required.

The proposed A5 scheme will pass Tully Bog SAC at a distance of approximately 205 metres. Air quality modelling has been undertaken using ADMS Roads. All works associated with the appropriate section will be carried out within 500 metres of the SAC. The initial modelling indicated that nitrogen deposition at Tully Bog SAC as a result of the proposal will be an additional 2 – 4 % of the critical load. This was indicated as being an error in modelling and an explanation has been

provided. The rationale within this document should clearly explain the parameters which have affected the results given its public availability.

The current modelling indicates that deposition would be between 0.2 and 0.4% of the critical load for the site. In line with current policies NIEA CDP considers the modelled values to be insignificant.

If you require any further information please contact Lee Jones on the above number.

Yours sincerely,

Keith Finegan
Authorised Officer

Cc: Manny Gault - Client Project Manager - A5 WTC – (email)

Subject: FW: 2017-06-05_SI to DAHG_HRA Consultation

From: Manager Dau [mailto:Manager.Dau@chg.gov.ie]
Sent: 02 October 2017 12:02
To: Ireland, Stuart <Stuart.Ireland@wsp.com>
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Hi Stuart,

The Department has no further nature conservation comments in relation to the updated documents.

Kind regards,

Yvonne

Yvonne Nolan
Development Applications Unit
Department of Culture, Heritage, and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

(053) 9117382

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

From: Ireland, Stuart [mailto:Stuart.Ireland@wsp.com]
Sent: 02 October 2017 10:13
To: Manager Dau
Subject: RE: 2017-06-05_SI to DAHG_HRA Consultation

Dear Yvonne,

As you may be aware, the 3rd consultation on the A5 Western Transport Corridor, Habitats Regulations Assessments, closes today.

Could you please let me know if NPWS has any comments to make in realtion to the updated documents?

Kind regards,

Stuart

Stuart Ireland ***BSc (Hons) CEnv MCIEEM***
Associate

stuart.ireland@wsp.com

M +44 (0) 7825 114127

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Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

DfI Roads Western Division
County Hall
Drumragh Avenue
Omagh
BT79 7AF

08 November 2017

Dear Sir/Madam

RE: 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment.

Thank you for your recent correspondence in relation to the above-mentioned proposed development. The Loughs Agency is the statutory body charged with the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

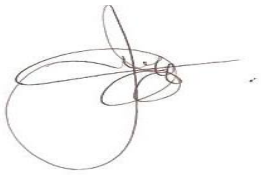
The Loughs Agency has considered the information provided in the 3rd draft consultation on the A5WTC Reports to Inform Appropriate Assessment and would have no further comments at this stage.

Yours sincerely

22 Victoria Road, Prehen, Londonderry, BT47 2AB
Tel: 028 71 342100 Fax: 028 71 342720 Txt Phone: 028 71 318000
www.loughs-agency.org

Loughs Agency

Gníomhaireacht na Lochanna
Factrie fur Loughs



John McCartney
Director of Conservation & Protection

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