The Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T))) Order

6.2 Environmental Statement: Volume II: Chapter 17. Habitats Regulations Assessment

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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This document is submitted in relation to the application for a proposed development by Norfolk County Council to the Planning Inspectorate, under the Planning Act 2008.

The application is for the Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T))) Order, to grant development consent for the construction of a new highway running west-east between the A1067 Fakenham Road and the A47 Trunk Road at Postwick, including improvements to the existing highway network to the north and north east of Norwich.

This document comprises part of the application documents and relates to Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.

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A. Introduction

A.1 Background

A.1.1 Mott MacDonald Ltd was appointed by Norfolk County Council to undertake a Habitats Regulations Assessment, in support of the development consent application for the Norwich Northern Distributor Road (NDR) Project in Norfolk ('the project'). The NDR is a project of national significance which requires a DCO under the Planning Act 2008. In accordance with Regulation 5(2)(g) of The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (The APFP Regulations) the development consent application must be accompanied by a report identifying any Natura 2000 site ('European site') or any Ramsar site, which may be affected by the proposed development, together with sufficient information that will enable the Competent Authority if required to make an appropriate assessment of the implications for the site.

A.2 The Purpose of the Habitats Regulations Assessment

A.2.1 In accordance with Article 6(3) of the Habitats Directive 'Article 6 Assessments' are required where a plan or project not directly connected with or necessary to the management of a Natura 2000 site(s), may give rise to significant effects upon a Natura 2000 site(s). The requirement for Article 6 Assessments has been transposed into UK law under Regulation 61(2) of the Conservation of Habitats and Species Regulations 2010 ('Habitats Regulations') (S.I. 2010/490) (as amended) and is commonly referred to as a 'Habitats Regulations Assessment' (HRA) or an 'Appropriate Assessment' (AA). 'Appropriate Assessment' is taken to mean an assessment which is "appropriate to its purpose under the Habitats Directive and Habitats Regulations" and is not to be confused with the second of the Article 6 Assessments with the same name (Department for Communities and Local Government (DCLG), 2006).

A.2.2 Natura 2000 sites include Special Protection Areas (SPAs), Special Areas for Conservation (SACs), candidate SACs and proposed SPAs, as well as Sites of Community Importance (SCIs) which have been adopted by the EC, but not yet formally designated by the government of Member State. In the UK, Ramsar sites are also required to undergo an assessment when a plan or project is considered likely to have a significant effect upon a site (Department for Environment, Food and Rural Affairs (Defra), 2006). Herein Ramsar sites are also referred to as Natura 2000 sites.

A.2.3 Before deciding to undertake a plan or project that may give rise to significant effects upon a Natura 2000 site, and that is not directly connected with or necessary to the management of a Natura 2000 site, a Competent Authority must make an assessment of the implications for that site in view of that site's conservation objectives. In the context of a DCO application under the Planning Act 2008 the Secretary of State is considered to be the Competent Authority with regard to Regulation 7(1) of the Habitats Regulations (The Planning Inspectorate, 2012). The Competent Authority must also consult with the Statutory Nature Conservation Body (SNCB), in this case Natural England (NE), and have regard to any representations made by that body. If other regulatory regimes require an HRA the applicant should also consult with the relevant competent authorities to determine if they are likely to adopt the outcomes of the HRA carried out by the Competent Authority under the Planning Act 2008.

A.2.4 The HRA is undertaken in a series of stages in the case of the assessment of projects (DCLG, 2006). These stages correspond with the Article 6 Assessments prescribed by the Habitats Directive (Figure 1.1). Each stage determines whether further stages in the process are required. The first stage identifies likely significant effects by identifying the presence or absence of significance indicators. If the conclusion of Stage 1 is that there will be no significant impacts on the Natura 2000 site, there is no requirement to undertake further stages.

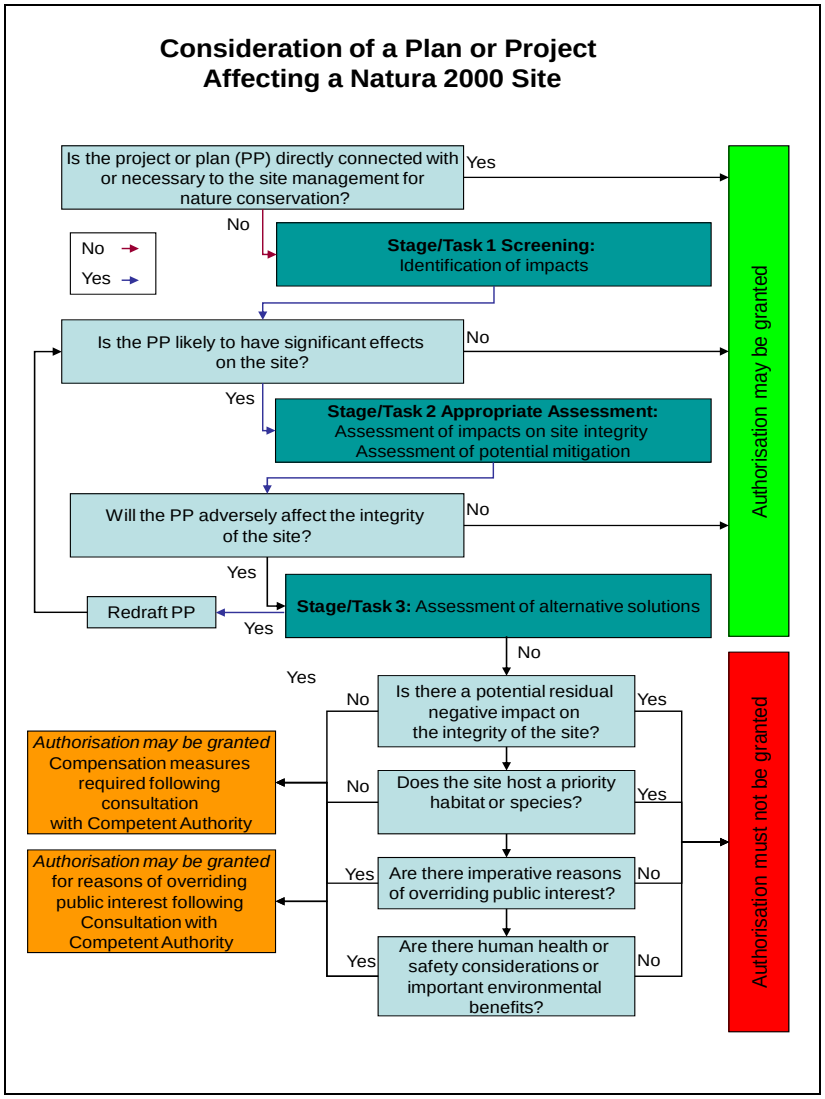
A.2.5 Where a project is likely to give rise to significant effects upon a Natura 2000 site, an assessment must be made of the implications on the integrity of that site in view of that site's structure, function and conservation objectives (Stage 2). Furthermore where there are adverse impacts, an assessment of potential mitigations will also be required in Stage 2. If it is concluded that adverse impacts are likely to remain after mitigation, there must be an examination of alternative ways to complete the project that avoids adverse impacts on the integrity of the site (Stage 3). Where alternatives exist these should be subjected to Stage 1 and/or Stage 2 assessments. Where no alternatives exist it is necessary under Article 6(4) of the Habitats Directive to identify if there are or are not imperative reasons for overriding public interest (IROPI). If there are IROPI then compensatory measures must be assessed (Stage 4).

A.2.6 To ensure compliance with the Habitat Regulations, applicants for DCOs located in England, or both England and Wales, can be supplied to the Planning Inspectorate as part of the DCO application. The evidence plan, a formal mechanism to agree upfront with the SNCB what information the applicant needs to supply is voluntary process and is a non-legally binding

agreement between the applicant and relevant SNCB (Defra, 2012). In this instance an evidence plan is not being submitted because of the extensive consultation with and comments from the SNCB regarding the project predating the start of the DCO application process.

A.2.7 In making this assessment, it is important to recognise that it will be appropriate to the likely scale, importance and impact of the project.

Figure A.1



A.3 Structure of this Report

A.3.1 The structure of this report includes the following elements:

A.3.2 Chapter B: Stage 1 Screening

- Step 1: Management of the Natura 2000 site(s);
- Step 2: Description of the project;
- Step 3: Characteristics of the Natura 2000 sSite(s); and
- Step 4: Assessment of significance.

A.3.3 Chapter C: Stage 1 Outcomes

- Screening matrix.

A.3.4 Chapter D: Stage 2 Appropriate Assessment

- Step 1: Information required;
- Step 2: Impact prediction;
- Step 3: Conservation objectives; and
- Step 4: Mitigation measures.

A.3.5 Chapter E: Stage 2 Outcomes

- Integrity matrix.

B. Stage 1 Screening

B.1 Introduction

B.1.1 This Stage 1 Screening Assessment has been undertaken in accordance with '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, 2001).

B.1.2 Definitions of conservation status, integrity and significance used in this report are defined in accordance with 'Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (European Commission, 2000) (Table B.1).

Table B.1 Definitions

Status	Description
Conservation status – species	The sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its population.
Conservation status – habitats	The sum of the influences acting on a natural habitat 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.
Integrity of a site	The coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified.
Significant effect	The deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the conservation objectives of the site.

B.1.3 A number of additional consents that may require an HRA will be required before the proposed project can proceed into the construction phase. Table

B.2 sets out the consents that would be required and the Competent Authority. The competent authorities are being consulted to determine if they are likely to adopt the outcomes of the HRA carried out by the Competent Authority under the Planning Act 2008.

Table B.2 Consents relevant to the HRA

Consent	Act	Competent Authority
Abstraction licence	Water Act 2003	Environment Agency
Dewatering licence	Water Act 2003	Environment Agency
Discharge licence for water	Environmental Permitting Regulations (England and Wales) 2010	Environment Agency
Discharge of substances to groundwater	Environmental Permitting Regulations (England and Wales) 2010	Environment Agency
Discharge trade effluent to sewage	Water Industry Act 1991	Anglian Water
Works in, under, over or within 9m of Main River, of works affecting the flow in an ordinary watercourse, and work affecting Main Drains in IDB district	Water Resources Act 1991	Environment Agency
	Land Drainage Act 1991	Norfolk Rivers IDB
Waste management licence	Environmental Permitting Regulations (England and Wales) 2010	Environment Agency
Mineral extraction	Town and Country Planning Act 1990	Norfolk County Council

B.2 Step 1: Management of the Natura 2000 Site(s)

B.2.1 The proposed project described below, is not directly connected with or necessary to the management of any Natura 2000 site.

B.3 Step 2: Description of the 'Project'

Introduction

B.3.1 The Scheme (the Norwich Northern Distributor Road, known as "the NDR") is a dual carriageway all-purpose strategic distributor road, to be classified as the A1270 Principal Road, which would link the A1067 Fakenham Road, near Attlebridge, to the A47 Trunk Road (T) at Postwick. This will be over a length of approximately 20.4 km. See the General Arrangement drawings in the Environmental Statement Volume 1, Appendix 1.

General Description: Scheme Route

B.3.2 From west to east, the scheme will start with a realignment of 750m of the A1067 Fakenham Road to the north of the existing carriageway, where the NDR (A1270) starts at a new at-grade roundabout junction, located to the west of Taverham. The NDR would then continue eastwards as a dual carriageway to its new at-grade roundabout junction with the C262 Fir Covert Road. From this roundabout, the NDR would then cross the Marriott's Way (a permissive path providing a pedestrian, cycling and horse riding facility along the route of a disused railway) which will be taken across the NDR via a new bridge), to a new at-grade roundabout junction with the C261 Reepham Road. The NDR would then continue south eastwards, crossing Bell Farm Track/Horsford Restricted Byway No. 5 (which will be taken up over the NDR via a new Restricted Byway and private access accommodation bridge) before connecting with a new at-grade roundabout junction, just west of the existing C282 Drayton Lane, and which new roundabout will have two new link road connections, one with the C261 Reepham Road and one with the B1149 Holt Road, to replace the existing Drayton Lane.

B.3.3 From here, the NDR would then continue south eastwards to a new grade-separated junction (provision of a bridge over the NDR with slip roads to/from the NDR) with the A140 Cromer Road, located close to and just north west of Norwich International Airport. The provision of this grade-separated junction will require the stopping up of lengths of the B1149 Holt Road and Holly Lane (U57142), as well as a length of the A140 Cromer Road, which will be

replaced by a new highway west of its existing position, which will be taken over the NDR and provide the connection for its four connecting slip roads. East of the A140, the NDR would continue as a dual carriageway, turning north eastwards around the northern boundary of the airport to a further new at-grade roundabout junction at the northern tip of the airport. The primary purpose of this roundabout is to allow the NDR to undertake a roughly 90 degree change of direction around the Airport site. From this roundabout, the NDR would continue south eastwards, skirting the north east boundary of the airport, before turning eastwards and passing under a new highway, which will be carried by bridge over the NDR, immediately to the east of the existing C246 Buxton Road, and which would provide the new connection for its realignment sections north and south of the NDR.

B.3.4 The route of the dual carriageway NDR would then continue eastwards through the north of Beeston Park. It would then connect with both the B1150 North Walsham Road and the A1151 Wroxham Road via a new at-grade roundabout at each location, before turning south eastwards and entering the north eastern section of Rackheath Park approximately 250 metres from the western end of Sir Edward Stracey Road (U57538). It would then continue south eastwards, passing under a new bridleway and access bridge across the NDR, some 200 metres south west of the junction of Newman Road (U57490) with Long's Crescent (U57852).

B.3.5 The NDR would then connect with the C283 Salhouse Road via a new at-grade roundabout, before rising up on an embankment (maximum height approximately 8.5 metres), to cross both the Norwich to Cromer & Sheringham rail line and the C874 Plumstead Road on individual bridges in close proximity, prior to a new at-grade roundabout on the NDR, which would connect it via a new link road to a further small at-grade roundabout on the C874 Plumstead Road.

B.3.6 The NDR route would then continue southwards, crossing under the C442 Middle Road (which would be raised to pass over the NDR, on its existing alignment, via a new bridge) before connecting with a new at-grade roundabout known as the Business Park Roundabout.

B.3.7 At this point a single carriageway link is provided westwards to the existing C829/C830 Broadland Way/C831 Peachman Way roundabout and includes an at-grade roundabout on the link road to the proposed Broadland Gate Business Park.

B.3.8 From the Business Park roundabout the NDR proceeds southwards as a dual carriageway to a new Postwick north east at-grade roundabout immediately north of the A47(T) Norwich Southern Bypass. This roundabout has links from a new A47(T) eastbound diverge slip road and a new A47(T) eastbound merge slip road. The NDR continues over the A47(T) as a four lane carriageway, one lane north and three south, on a new bridge and terminates at its southernmost point at a signalised junction, which replaces the existing Park and Ride roundabout with the A1042 Yarmouth Road.

B.3.9 This signalised junction provides further links:

- Directly to and from the park and ride site for buses;
- West to the existing Postwick North West roundabout, via the existing Postwick bridge over the A47(T);
- East to the proposed park and ride site entrance at the proposed Oak's Lane roundabout and further east to the Brundall Low Road junction with the A1042 Yarmouth Road to Postwick village; and
- West to the A47(T) via an existing westbound merge slip road.

B.3.10 The works at Postwick Junction, will include modifications to the existing Postwick north west roundabout (as a result of closing the existing eastbound diverge slip road) and to the existing A1042 Yarmouth Road overbridge of the A47(T), to provide revised traffic lanes and the provision of a shared use cycle/footway.

B.3.11 The route of the NDR that has been described above is, for the majority of its length, within Broadland District. It does, however, for a short stretch close to Norwich International Airport, fall within the administrative area of Norwich City Council. A very small part of the works at Postwick falls within the administrative area of The Broads Authority. The new road from west to east runs through the following parishes:

- Attlebridge;
- Taverham;
- Drayton;
- Horsford;
- Horsham St. Faith and Newton St.Faith;

- Spixworth;
- Beeston St. Andrew;
- Sprowston;
- Rackheath;
- Great and Little Plumstead; and
- Postwick with Witton.

Overview of scheme features

B.3.12 As described above, the scheme consists of a number of different features which are detailed further below. The location of the proposed Scheme features is measured by reference to the "chainage", which is the distance from the start of the scheme, at its junction with the A1067 Fakenham Road, in metres.

B.3.13 There will be ten new highway structures, which consist of six overbridges and four underbridges carrying the following existing routes, or new routes as necessary, either under or over the NDR.

Table B.3 Overbridges

Overbridge	**Chainage**
Marriott's Way – permissive path providing a pedestrian, cycling and horse riding facility along the route of a disused railway	2390
Bell Farm Track – Horsford Restricted Byway No. 5 and private means of access	3980
New A140 Cromer Road	6800
New road - C246 Buxton Road replacement	10940
Private means of access and new bridleway leading from Newman Road (U57490)	15500
C442 Middle Road	18060

Table B.4 Underbridges

Underbridge	Chainage
Norwich to Cromer & Sheringham railway line	16920
C874 Plumstead Road	17010
New flood culvert/bat underpass which will be located to the west of Rackheath	14810
A47 Trunk Road at Postwick	20220

Table B.5 Grade Separated Junctions

Junction	Chainage
A140 Cromer Road (to include eastbound and westbound merge and diverge slip roads)	6800
A47 Trunk Road at Postwick (to include new roundabout east of the existing roundabout with provision of new eastbound diverge and eastbound merge slip roads to/from the A47(T))	19450 - 20400

Table B.6 At-Grade Roundabout Junctions

Junction	Chainage
A1067 Fakenham Road	510
C262 Fir Covert Road	1750
C261 Reepham Road	2910
New Highway links just west of C282 Drayton Lane	5330
B1150 North Walsham Road	12100
A1151 Wroxham Road	14240

C283 Salhouse Road	16100
C874 Plumstead Road (South)	17300

Table B.7 On-line Access Roundabouts

Access roundabouts	**Chainage**
Northernmost point of Norwich Airport to include a new highway access to the Petans offshore training facilities and secure access to Norwich International Airport	9120
At the proposed Broadland Gate Business Park location to link the NDR to the proposed Broadland Gate Link Road	19450 – 20400

Table B.8 Off-line Roundabouts

Off-line roundabouts	**Chainage**
C282 Drayton Lane/B1149 Holt Road junction	Off-line
C874 Plumstead Road (North)	Off-line
Proposed site of the Broadland Gate Business Park, off the Broadland Gate Link Road	Off-line

Table B.9 Major/minor Priority Junction

Junction	**Chainage**
C282 Drayton Lane/C621 Reepham Road	Off-line

Table B.10 Bat Gantries

Bat gantry	**Chainage**
Along the line of Attlebridge Restricted Byway No.3	760

Along the line of track to Glebe Farm	5780
Approximately 150 metres south west of Quaker Farm	10020
Approximately 150 metres north east of North Park Cottage	12650
Along the line of track approximately 400 metres east of Park Farm	13140
Along the line of track approximately 250 metres north west of Oak's Farm	17730
Parallel with Smee Lane (U59400)	19000

B.3.14 To convey natural runoff under the NDR, a number of culverts will be provided.

Table B.11 Road Closures

Road closures	**Chainage**
Breck Farm Lane (U57168) to the south of the NDR	2525
Furze Lane (U57168) to the north of the NDR	2525
C282 Drayton Lane – a 892 metres length from its junction with the C261 Reepham Road	5350
B1149 Holt Road to north of the NDR	6600
Holly Lane (U57142) to the South of the NDR	6600
C251 Bullock Hill to the North of the NDR	8900
Quaker Lane (U57188) to the North of the NDR	9820
C251 St. Faiths Road to the South of the NDR	9990
C258 Broad Lane at its junction with C874 Plumstead Road/Norwich Road (by Traffic Regulation)	17010
Low Road (U59392) to the east and west of the NDR	18380
Smee Lane (U59400) to the east and west of the NDR	19000

A length of the existing A47(T) eastbound diverge slip road, from the A47(T) connection point with the new eastbound diverge slip road, eastwards to the existing Postwick North West roundabout	19500
A length of the existing A47(T) eastbound merge slip road, from its junction with Postwick North West roundabout, eastwards to the connection point with the new A47(T) eastbound merge slip road	19500

B.3.15 Public and Private Rights of Way to be stopped up/diverted

Table B.12 Public and private Rights of Way to be stopped up/diverted

Tracks and Rights of Way	**Chainage**
Private: Access Track running north-south between the A1067 Fakenham Road and Attlebridge Restricted Byway No.3, to the north of the NDR)	700
Public: A 386 metre length of Attlebridge Restricted Byway No. 3, north westwards from its junction with the A1067 Fakenham Road (a diverted route from the northern side of the A1067 Fakenham Road Roundabout to be provided)	760
Private: A length of Access Track running along a co-existent route with Attlebridge Restricted Byway No.3, to the north of the NDR	760
Private: A length of Access Track running along a co-existent route with Drayton Restricted Byway No.6, north eastwards off the C261 Reepham Road, to Felthorpe Woods	3000
Private: A length of Access Track running north eastwards, to agricultural land, off the C261 Reepham Road	3000
Private: Access Track, leading to Bell Farm, from the C261 Reepham Road, opposite Long Dale (U51249), to Dog Lane (U57176), to the north and south of the NDR	3750
Private: Bell Farm Track to be placed on a diverted route on overbridge of the NDR	4000
Private: AccessTrack running from the C261 Reepham Road to	5150

Glebe Farm on B1149 Holt Road, to the north and south of the NDR	
Public: Horsford Restricted Byway No.7 – a 60 metre length from its junction with the C282 Drayton Lane (remaining length will connect with new Drayton Lane (north) Link Road))	5300
Private: Access Track at the southern termination point of C250 Old Norwich Road, to Norwich International Airport Control Tower and Airport curtilage, to the north of the NDR	7900
Public: Horsham St. Faith and the Newton St. Faith Bridleway No.6, to the west of the NDR	8900
Public: Spixworth Bridleway No.1, to the east of the NDR	9800
Private: Access Track leading north of Red Hall Farm, Beeston Lane (U57186), to the north and south of the NDR	11730
Private: AccessTrack leading north off Beeston Lane (U57186), approximately 400 metres east of Park Farm, to the north and south of the NDR	13150
Private: Access Track leading south west from the C258 Green Lane West, to the pumping station, to the north and south of the NDR	14800
Private: AccessTrack leading from the existing Newman Track west of Gazebo Farm in a northerly direction for approximately 250 metres.	15200
Private: Access Track leading from the realigned Newman Track on the east of overbridge leading northwards for approximately 80 metres.	15500
Private: Access Track leading southwards from Newman Road (U57490)/Long's Crescent (U57852) junction, over its length to the circulatory track around March Farm, Park Gardens etc.	15500
Private: Access Track leading from C258 Green Lane West to Hall Farm, west of the NDR	15800
Public: Great and Little Plumstead Footpath No.5, to the east and west of the NDR	18750
Private: Access Track running along a co-existent route with Great and Little Plumstead Footpath No.5 to the Nurseries, to the east and	18750

west of the NDR	
Public: Postwick Footpath No.2 – a 700 metre length from its junction with the A1042 Yarmouth Road.	19000

B.3.16 A number of other highways are to be stopped up under the NDR proposals, but which are to be replaced by the NDR itself, or parts of it, or by other new highways.

B.3.17 A number of other private means of access to premises are to be stopped up under the NDR proposals, but which are to be replaced by other new means of access to premises, other than where another reasonably convenient means of access to those premises already exists.

Table B.13 Diversions of Public Rights of Way

Track and Rights of Way diversions	**Chainage**
Public: Attlebridge Restricted Byway No. 3 (to the North of the NDR) diverted alongside the NDR to join the A1067 Fakenham Road roundabout.	750
Public: Drayton Restricted Byway No. 6 diverted around the north of the NDR Reepham Road roundabout to join the roundabout.	3000
Public: Horsford Restricted Byway No. 5 diverted over the new Bell Farm Overbridge.	3950

New Links

B.3.18 Approximately 25 kilometres of new links suitable for use by pedestrians, cyclists and equestrians where permitted would be provided alongside, over, and connecting with, in places, the NDR route, together with improved surfacing provided on some existing rights of way.

B.3.19 The new links provided for use by pedestrians, cyclists and equestrians would be provided alongside the NDR route within the landscape strip. These would link to existing facilities and be screened from the NDR carriageway by a combination of low mounds and/or hedge and tree planting.

B.3.20 Where individual or joint access to premises will be severed by the NDR, new accesses will be provided to link these to the NDR or to other existing roads, other than where the premises are already served by another reasonably convenient means of accessUtility diversion works will also be required at multiple locations (Table B.14).

Table B.14 Utility Works

Utility company	**Number of diversions**
EDF	22
Government pipelines	1
National Grid Gas	9
National Grid Gas (High P)	1
British Telecom	16
Anglian Water (potable)	16
Anglian Water (Sewers)	7
Biffa	1
Virgin Media	1

Complementary works

B.3.21 It is proposed to carry out the following off-line complimentary works:

- Relocation of the C258 Green Lane West junction with the A1151 Wroxham Road, by provision of a new highway connection from the C258 Green Lane West to the A1151 Wroxham Road, 75 metres to the south west of its existing junction, together with closure of the existing junction (by Traffic Regulation) and turning the remaining C258 Green Lane West into a residential cul-de-sac;
- Closure of the C249 Rackheath Lane at its junction with the B1150 North Walsham Road (by Traffic Regulation), together with widening of the C249 Crostwick Lane arm of the junction;

- Highway improvements measures on the C874 Plumstead Road through Thorpe End; and
- The provision of a shared use footway/cycleway, within the northern highway verge of the C261 Reepham Road, between its junction with Horsford Restricted Byway No.5 and Long Dale (U51249).

Lighting

B.3.22 1.7.1 The majority of the proposed scheme will not be lit. The exception to this is the Postwick Junction area of the scheme which will provide lighting as follows:

Table B.16 Lighting Scheme

Illumination	**Chainage**
From the Business Park roundabout westwards to the C829 Broadland Way/C831 Peachman Way roundabout.	19450 - 20400
From the Business Park roundabout southwards to and including the Postwick North East roundabout.	19450 - 20400
South from the Postwick North East roundabout across the new NDR overbridge of the A47(T) to the signalised junction on the A1042 Yarmouth Road.	19450 - 20400
The A1042 Yarmouth Road signalised junction.	19450 - 20400
On the existing A1042 Yarmouth Road bridge over the A47(T).	19450 - 20400
From the existing A1042 Yarmouth Road bridge over the A47(T) to and including Postwick North West roundabout.	19450 - 20400

Proposed Traffic Regulation Orders

B.3.23 In addition to the above scheme features, it is proposed that the following Permanent Traffic Regulation measures will be brought into effect:

- Clearway for the entire length of the NDR between and including the A1067 Fakenham Road roundabout and A47(T) at Postwick and roads forming the Postwick Hub junction and Broadland Gate link;
- Amendment to speed limits on existing routes where these are bisected on the NDR;
- Extension of the existing 30 mph speed limit on the C442 Middle Road westwards to a point immediately west of the proposed bridge over the NDR, to include the built-up extents of Toad Lane closest to Middle Road;
- 40 mph speed limit to roads forming the Postwick Junction, south of and including the proposed Broadland Gate link;
- Prohibition of entry on the NDR Diverge Slip Roads at the A140 Cromer Road junction (at their connection points with the NDR Cromer Road Roundabout North and the A140 Cromer Road Roundabout South) and on the new A47(T) eastbound Diverge Slip Road at its connection point with Postwick North East Roundabout;
- 30 mph, 40 mph and 50 mph speed limits on components of the Drayton Lane Link Road;
- Extension of 30 mph speed limit on the B1149 Holt Road to include the new roundabout;
- Extension of 30 mph speed limit on the C283 Salhouse Road;
- Extension of 40 mph speed limit on the C874 Plumstead Road/Norwich Road;
- 40 mph speed limit on new Plumstead Road Link Road;
- Amendments to existing 7.5T weight restrictions on the U59400 Smee Lane, the U59393 Low Road, the U57188 Quaker Lane and the C251 St. Faiths Road;
- Prohibition of Motor Vehicles on the C249 Rackheath Lane at its junction with the B1150 North Walsham Road;
- Prohibition of Motor Vehicles on the C258 Green Lane West at its junction with the A1151 Wroxham Road;
- Prohibition of Motor Vehicles on the C258 Broad Lane (north western leg) at its junction with the C874 Norwich Road; and

- Prohibition of Motor Vehicles (except for buses) at the western entrance to the Postwick Park and Ride site.

Natura 2000 Sites

B.3.24 Distances between the project and Natura 2000 sites up to a 25km threshold are given in Table B.17.

Table B.17 Distance between project and Natura 2000 sites within 25km

Site Name	Designation	Distance from NDR (km)
River Wensum	**SAC**	**0.215**
Broadland	SPA/Ramsar	1.757
The Broads	SAC	1.757
Norfolk Valley Fens	SAC	5.298
Breydon Water	SPA/Ramsar	15.215
Paston Great Barn	SAC	20.898
Winterton-Horsey Dunes	SAC	20.902
Great Yarmouth North Denes	SPA	21.411
Outer Thames Estuary	SPA	23.522

B.3.25 Natural England have advised Norfolk County Council that “In our view it is likely that it [the proposed project] will have a significant effect on the River Wensum SAC and therefore will require assessment under the Habitats Regulations” (Natural England in The Planning Inspectorate, 2012). This reiterates the advice from a meeting held on 12 April 2006, where Natural England, then known as English Nature, confirmed that an HRA would be required in respect of the River Wensum SAC but not for the Broad SAC/SPA/Ramsar (English Nature in Planning and Transportation Technical Group, 2007). Therefore all Natura 2000 sites other than the River Wensum SAC have been scoped out from this assessment.

The Zone of Influence

B.3.26 Projects have the potential to impact on Natura 2000 sites beyond the confines of the individual sites themselves. Guidance on Ecological Impact Assessment (Institute of Ecology and Environmental Management, 2006) states that potential effects should be investigated which occur within the Zone of Influence (ZoI) that arises during the whole lifespan of the proposed project or plan. The potential Zone of Influence is defined as:

- Areas directly within the land take for the proposed development;
- Areas which will be temporarily affected;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and disturbance (e.g. noise).

B.3.27 The ZoI therefore includes:

- The footprint of the project with a particular focus on the first 1750m of the route between Fakenham Road and Fir Covert Road; and
- A geographic area to assess potential indirect and cumulative impacts defined by potential impact pathways.

B.4 Step 3: Characteristics of the Natura 2000 Site(s)

River Wensum SAC

B.4.1 The relevant Natura 2000 Standard Data Forms and the Information Sheet on Ramsar Wetlands (RIS) can be found in Appendix B.

B.4.2 The River Wensum SAC is designated for:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (Good value*);
- White-clawed crayfish *Austropotamobius pallipes* (Good value*);

- Desmoulin's whorl snail *Vertigo moulinsiana* (Significant value*);
- Brook lamprey *Lampetra planeri* (Significant value*); and
- Bullhead *Cottus gobio* (Significant value*).

B.4.3 * Global assessment of the value of the site for conservation of the habitats and species concerned on a scale in descending order of 'excellent value' – 'good value' – 'significant value' (European Commission, 1999).

B.4.4 With regard to the natural habitats and/or species for which the site has been designated the conservation objectives are to:

B.4.5 Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

B.4.6 Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

B.4.7 Many units of the River Wensum are not in favourable condition. Unit 53, the closest to the NDR, is in unfavourable declining condition due to:

- Inappropriate water levels;
- Inappropriate weirs dams and other structures;
- Invasive freshwater species;
- Water abstraction;
- Water pollution - agriculture/run-off; and

- Water pollution – discharge.

B.4.8 In 2005, surveys of the River Wensum SAC were undertaken by three local consultants at Attlebridge Hall, the closest location along the river in relation to the NDR:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation (Jane Harris);
- White-clawed crayfish (Philip Parker Associates);
- Desmoulin`s whorl snail (The Wheatfen Partnership);
- Brook lamprey (Philip Parker Associates); and
- Bullhead (Philip Parker Associates).

B.4.9 The River Wensum at Attlebridge Hall is a broad meandering section passing through improved grassland. The channel is mainly 10m wide, but widening at the ford to about 20m. Generally deep (up to 1m) but with a shallow section (20cm) with riffles at the ford and footbridge, the substrate is only visible at the ford and comprising clean gravels, but more silty in deeper areas. Most of the section was open and unshaded, apart from a line of willow and alder trees on the right bank upstream of the ford. The banks were soft but cattle were excluded by electric fencing for the entire length, and there was a marginal fringe of *Phalaris arundinaceae* and *Glyceria maxima* for the majority of the section with occasional stands of *Rorripa nasturtium-aquaticum*, *Sparganium erectum* and *Apium nodiflorum*. Shrubs of *Salix fragilis* and *Salix viminalis* were scattered along both banks, and the bankside vegetation protected by the fencing was predominantly nettle and tall grasses. Aquatic vegetation in deep water was dominated by *Sparganium emersum*, *Potamogeton perfoliatus* and *Potamogeton pectinatus* with *Schoenoplectus lacustris*, *Zanichellia palustris*, *Ranunculus penicillatus* subsp. *pseudofluitans* and *Fontinalis antipyretica*. Occasional plants of *Myriophyllum spicatum*, *Zanichellia palustris* and *Callitriche* sp. were recorded. Filamentous algae were frequent and *Enteromorpha* was also recorded.

B.4.10 Presence/absence of qualifying features is summarised in Table B.18. Although two qualifying features (brook lamprey and Desmoulin's whorl snail) were not observed for the purposes of the HRA it is assumed under the precautionary principle that these species are likely to be present. All features are considered to be present in significant extent/numbers.

Table B.18 Presence/absence of qualifying features

Qualifying feature	Presence/absence
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	*Ranunculus penicillatus* ssp. *pseudofluitans*, *Zannichellia palustris*, *Potamogeton* spp. and *Fontinalis antipyretica*
White-clawed Crayfish	2 adults (by bridge), 1 immature - species easily found in suitable habitat).
Bullhead	2 adults (by bridge) - an abundance of suitable refuges in the form of large stones and debris, although suitable habitat limited to short stretches of river.
Brook Lamprey	None – despite much sampling effort and an abundance of suitable habitat.
Desmoulin's Whorl Snail	None – too steeply banked, although does support reed sweet-grass and reed canary grass. Riparian land management makes this stretches of river unsuitable.

Identification of Potential Effects

Potential Effects

B.4.11 Potential effects, alone or in combination, upon the River Wensum SAC which have been considered during the consultation process with the SNCB are listed in Table B.19. Potential effects during the construction and operational phases of the project have been considered. Decommissioning has not been considered as there is sufficient uncertainty with regards to whether the road would be decommissioned at any time in the future. Such a plan would be subjected to a Habitats Regulations Assessment, taking into account the baseline conditions at such a time in the future that may differ markedly from

the current baseline condition. A review of the ecological requirements of the River Wensum SAC qualifying features was undertaken using pertinent literature (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Killeen & Moorkens, 2003; Maitland, 2003; Tomlinson & Perrow, 2003). The sensitivity of the River Wensum SAC qualifying features to the potential effects identified during consultation is given in Table B.20.

Table B.19 Potential effects

Potential Effects	Construction	Operation
Change in groundwater levels	✓ (possible, measures required to control drainage infiltration)	✓ (possible, measures required to control drainage infiltration)
Change in water chemistry	✓ (possible, measures required to control run-off and infiltration including from spillages and accidents)	✓ (possible, measures required to control run-off and infiltration as well as treat accident and spillage run-off)
Change in water flow	✓ (possible, measures required to control drainage infiltration)	✓ (possible, measures required to control drainage infiltration
Artificial light	X (no works south of A1067, distance greater than 200 m from River Wensum SAC)	X (no illumination, lit only within the wider Postwick area (east) end of route)
Loss of channel habitat	X (no works south of A1067)	X (road north of A1067)
Noise and vibration	X (no works south of A1067)	X (road north of A1067)
Removal of riparian vegetation	X (no works south of A1067)	X (road north of A1067)
Shade	X (no works south of A1067)	X (road north of A1067)

Siltation	✓(possible, measures required to control run-off)	✓(possible, measures required to control run-off)

Table B.20 Presence/absence of qualifying features

Qualifying features	**Change in groundwater levels**	**Change in water chemistry**	**Change in water flow**	**Siltation**
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation[a]		✓	✓	✓
White-clawed crayfish[b]		✓	✓	✓
Bullhead[c]		✓	✓	✓
Brook Lamprey[d]		✓	✓	✓
Desmoulin's whorl snail[e]	✓	✓	✓	

Potential Pathways

Surface Water

B.4.12 The existing road (the A1067 Fakenham Road) forms a slight ridge across the dry valley which will be the location of about the first 300m of the new route. This ridge causes the land surface to the east of the existing road (ie. away from the River Wensum) to dip to a low point through which the new road

would pass. The new road would be constructed at or very close to existing ground levels here so this topographic low would remain in situ. Thus, the existing road creates a barrier to any surface run-off from the new route flowing directly towards the River Wensum flood plain.

B.4.13 As stated above the valley in this area is dry and there is no watercourse or ditch running down its central axis – so it has been dry for a very long period of time. This sort of dry valley is common in areas with chalk underlying permeable superficial deposits (as exists here). The Internal Drainage Board (IDB) has been contacted for information on drainage ditches in the area – they maintain numerous small ditches in the main flood plain which is located on the other side of the golf course from the NDR. The IDB area of responsibility does not extend into the golf course area and thus they do not have information on ditches or streams that might exist outside of the flood plain.

B.4.14 Site visits have confirmed that there are no ditches connecting the dry valley and the River Wensum, this has also been confirmed in discussions with the owner of the golf course. During this discussion the owner stated that in periods of very high and intense rainfall surface water flow does occur and runs across the golf course towards the main river channel, but rarely actually reaches the river channel itself. The cause of this surface water flow he attributes to the existing road drainage directing run-off to the low point along the road where upon it discharges onto the golf course.

B.4.15 There is a small earth bund running along the west side of the road (closest to the river) where it crosses the valley. This is immediately next to a shallow ditch (possibly caused in constructing the bund, or vice versa). It is not clear what the purpose of the bund/ditch is or who owns this but it will cause run-off from the road to be directed towards the low point in the road where it could then discharge through a small gap in the bund onto the golf course.

B.4.16 A programme of water quality monitoring of the surface watercourses in the area was implemented and samples were taken intermittently at quarterly intervals between September 2006 and June 2013. Normal road run-off is potentially polluting as it contains numerous heavy metals and hydrocarbons (or their associated combustion products). The River Wensum and the River Yare samples showed no detectable levels of polyaromatic hydrocarbons (PAH).

B.4.17 The following roads have been identified as key off-route roads at the western end of the NDR:

- Marl Hill Road;
- Weston Hall Road;
- Ringland Road;
- Taverham Lane; and
- Costessey Lane.

B.4.18 Traffic flows along these routes may change in relation to the baseline traffic flows as a result of the operation of the NDR and are therefore included in this assessment. All these roads have been surveyed during a "drive along" check in spring 2007, and at the time none showed evidence of serious direct discharge potential to the River Wensum. A detailed description and photographs of these locations are provided in Appendix B and is detailed in drawing: Existing Road Drainage and Sediment Ingress Points in Appendix A. Almost all have fields or field boundaries and hedges, or grassed river banks between the roads and the river. As far as could be identified all sections of the road have no significant formal drainage except where bridges cross over the river, or where roads enter residential areas (mainly in Costessey itself). Where bridges cross the River Wensum the bridge deck itself would be drained but the area of carriageway affected in such instances was relatively small.

Groundwater

B.4.19 The main aquifer in the area is the chalk which outcrops along the River Wensum valley and is overlain by variable superficial deposits (normally less than 10 metres thick) in the area. Eleven boreholes have been drilled around the western end of the NDR layout as detailed in drawing: Borehole Location in Appendix A. These are (in chainage order) PW1a, PW3, PW4, P0, PW1, PW2, PW5, P10, P12 and PW6. Eight boreholes are located approximately along the line of the proposed route between chainage 120 and 1759, with three offline to the south between chainage 505 and 1875. Boreholes which are used for monitoring the groundwater level and quality around the perimeter of the Attlebridge Landfill site (BH13, Bh14, GW22, 23, 24, 25, 26, 27 and GW28) are also illustrated. The landfill boreholes are all located in an arc that is roughly parallel to, but 700m north of the NDR.

B.4.20 The geology map for the area shows Upper Chalk outcropping in the lowest areas of the new road with this overlain by Crag and Corton Formations as

the route progresses up out of the Wensum valley as detailed in drawing: Solid and Drift Geology in Appendix A. Borehole logs show that the geology in the area of the road alignment is actually made up of two to six metres of sand/silt/clay over Chalk in the area of the NDR alignment and the outcropping Upper Chalk is not exposed as detailed in drawing: Depth to Top of Chalk in Appendix A.

B.4.21 An isopachyte map for this area, as detailed in drawing: Geological Longsection within 50m of the NDR in Appendix A, shows the depth of superficial deposits over the chalk. The top of the Chalk shows a valley feature that is similar to the existing land surface valley. However, the chalk surface would appear to rise and fall in a more dramatic fashion to the north of the NDR, near the Attlebridge landfill, where top of Chalk elevations can vary as much as seven metres between adjacent monitoring boreholes (eg. GW22 and GW23) as detailed in drawing: Depth to Top of Chalk in Appendix A.

B.4.22 The ground level along the NDR alignment varies between 16.5 and 20.94mAOD (Above Ordnance Datum) within the first 1200m of the route, as detailed in drawing: Depth to Top of Chalk in Appendix A. Groundwater levels are between 8.26 and 10.52mAOD. The low point in the proposed route is coincident with existing ground levels and with the deepest groundwater levels. The average unsaturated thickness for September 2006 to 2013 monitoring was between 6.59m and 12.13m along the proposed alignment. The elevation of the Wensum itself is estimated to be about 8mAOD and the groundwater surface varies from about 9mAOD to over 17.5mAOD in the area (increasing to the east). Regionally the groundwater flow is sub-parallel to the Wensum valley – flowing from the northwest to the southeast.

B.4.23 Groundwater contours are available at two scales from two different sources. A regional map of the chalk hydrogeology is available based on information collated in 1976, a drought year which will lead to deeper than normal groundwater levels. Local information is available from monitoring carried out by the landfill operators and, most recently, for the project. Careful examination of the 1976 groundwater levels shows groundwater flow is from the north east to the south west towards the River Wensum but that locally there is an apparent divergence of ground flow in the vicinity of the first 1000m of the NDR. Drawing: Depth of Groundwater in Appendix A shows that overall flow is towards the Wensum from the east and northeast across which the NDR will be located.

B.4.24 A programme of groundwater monitoring was implemented and water samples were collected from site investigation and groundwater level

monitoring boreholes installed in support of this project. Water samples were taken at quarterly intervals between September 2006 and 2008, with further samples in May, June and July 2013. Groundwater quality data was also sourced from the operator of Attlebridge Landfill Site. The purpose of the monitoring is to establish a robust understanding of the seasonal variations in the groundwater level and the baseline groundwater chemistry. Samples were collected on a quarterly basis and analysed for a suite of parameters that include standard quality indicators used by the Environment Agency and typical road run-off pollutants. The purpose of this monitoring has been to establish a robust understanding of the seasonal variations in the baseline groundwater chemistry.

B.4.25 Generally the groundwater is good quality and there are few contaminants associated with road run-off detected in the samples taken. Elevated levels of metals occur down gradient from the Attlebridge Landfill site, where a leachate plume is known to exist (approximately where Drainage Lagoon 1A would be located).

Plans and projects which might act in combination

B.4.26 Current and proposed plans or projects which might act in combination with the project have been identified:

- On the basis that “planning permission (or any other relevant regulatory consent) has been applied for or granted but not yet implemented or completed” (Defra, 2013) and;
- Where there is credible evidence that there is a real risk rather than a hypothetical risk of a potential effect (Peter Charles Boggis and Easton Bavants Conservation v Natural England and Waveney District Council, High Court of Justice Court of Appeal case C1/2009/0041/QBACF Citation No [2009] EWCA Civ. 1061 20th October 2009).

B.4.27 The potential effects on the River Wensum SAC (as identified above) considered in the in combination assessment include:

- Change in groundwater levels;
- Change in water chemistry;
- Change in water flow; and
- Siltation.

Greater Norwich Development Partnership Joint Core Strategy

B.4.28 The Joint Core Strategy (JCS) was prepared by the Greater Norwich Development Partnership which includes South Norfolk District Council, Broadland District Council, Norwich City Council and Norfolk County Council. The JCS sets out areas for development including transport infrastructure and the allocation of housing.

B.4.29 The main issue from the HRA of the JCS was the potential effect on the River Wensum SAC from the public water supply abstraction at Costessey. The Environment Agency's review of consents established the scale of the water abstraction that would not result in an adverse impact on the integrity of the River Wensum SAC. A position statement from Anglian Water, the Environment Agency and Natural England presented at the JCS public enquiry agreed that:

- Abstraction at Costessey would be capped at historic levels; and
- Potential solutions would be considered by Anglian Water during the development of the Water Resource Management Plan and a preferred option would be submitted to the regulatory body in 2014 for implementation in the period 2015-2020.

B.4.30 Modifications to policy MM4 and MM5 delete the previously assumed housing trajectory for delivery in the Broadland part of the Norwich Policy Area. The revised trajectory is lower than the expected rate of housing delivery in the period up to 2015, a broadly similar rate from 2015 to 2020 and a higher rate of delivery post 2020, from 750 units to around 900 units per annum. This will lead to a slightly reduced delivery over the entire plan period. This will result in a greater proportion of the housing being delivered after the mitigation measures for the River Wensum SAC are delivered. These measures are scheduled for delivery during 2015 to 2020 in the Anglian Water draft 2014 Water Resources Management Plan. This will lead to an overall reduction in the effects of housing development on the SAC and therefore cumulative effects with respect to water quantity are not reasonably foreseeable.

B.4.31 The HRA of the JCS also identified increased traffic due to developments planned under Policy 6 ('Access and transportation') and Policy 12 ('The

remainder of the Norwich urban area, including the fringe parishes') as likely to have a significant effect on the River Wensum SAC. Policy 6 is implemented primarily through the Norwich Area Transportation Strategy (NATS). The NATS includes the NDR as part of the strategy and is assessed (excluding the NDR) separately below.

B.4.32 There is the potential for policies in the JCS to act in combination with the NDR that would result in a likely significant effect on the River Wensum as a result of change in groundwater levels, change in water chemistry, change in water flow, and/or siltation through increased sediment ingress from highways run-off.

B.4.33 Developments such as Beyond Green (Broadland Application No. 20121516), White House Farm, Blue Bore Lane (Broadland Application No. 20080367) and land at Brook Farm and Laurel Farm (Broadland Application No.20090886) are in accordance with, and implement the policies set out in the JCS and have therefore been considered in the assessment of the cumulative effects above.

Water Resource Management Plan

B.4.34 All water companies are required to prepare a Water Resource Management Plan (WRMP) to comply with the statutory requirements in the Water Resources Management Plan Regulations 2007 issued by the Secretary of State in exercise of the powers conferred by the Water Act 2003. The purpose of the WRMP is to set out how a water company intends to deliver water supplies to their catchment over a period of 25 years.

B.4.35 Anglian Water Services (AWS) published their previous WRMP in February 2010. It sets out the strategy for maintaining a secure supply-demand balance through a combination of demand management measures, transfers and water resource development. New WRMPs are prepared every five years and reviewed annually as part of the WRMP Annual Review that involves the production of a standalone report and table that are submitted to Defra as part of the WRMP statutory review process. A draft WRMP has recently been published by AWS and is due to be published in 2014. A Task 2 Appropriate Assessment has identified two options within the Norwich resource zone, i.e. 'Norwich direct intake' and 'Norwich water reuse', as having a likely significant effect on a Natura 2000 site(s). Therefore an in combination assessment cannot be completed at this stage with regards to these options. Furthermore on-going investigations with regards to hydrological connectivity and raw

water quality related to other options linked to the River Wensum means that an in combination assessment cannot be completed at this stage. It is assumed that following future investigations the feasible options will:

- Not lead to a deterioration in the River Wensum SAC; and
- Will be within consent limits agreed with the Environment Agency and Natural England.

B.4.36 Furthermore any capital delivery related to the feasible options that have a potential to affect the River Wensum will be subjected to an HRA prior to implementation by the Competent Authority and therefore cumulative effects are not reasonably foreseeable.

Norwich Area Transportation Strategy (NATS)

B.4.37 The JCS highlights the need to implement the Norwich Area Transportation Strategy (NATS) to achieve the objectives and aspirations for Norwich and its surrounding area. NATS plays a key role in identifying the problems facing the transport system and sets out how the transport system is to be developed to overcome the problems identified. NATS identifies the need for a package of transport improvements and measures including a Norwich Northern Distributor Road. NATS, and the need for a distributor road to the north of the city, have been in place in various forms since at least 1992.

River Wensum Restoration Strategy

B.4.38 The aim of the River Wensum Restoration Strategy, a partnership between Natural England, the Environment Agency, Water Management Alliance and stakeholders, "is not to achieve some former "natural" condition of the river, but to restore a measure of hydrological functioning so that it can sustain wildlife and fisheries characteristic of the river type" (Coombes et al, 2007). Cumulative effects between any phase of the project and the implementation of the River Wensum Restoration Strategy are not reasonably foreseeable.

B.4.39 Natural England have advised Norfolk County Council that "In our view it is likely that it [the NDR] will have a significant effect on the River Wensum SAC and therefore will require assessment under the Habitats Regulations" (Natural England in The Planning Inspectorate, 2012). The Task 1 Screening identified surface water and groundwater pathways between the NDR and the River Wensum, with the following likely significant effects:

- Change in groundwater levels and change in water flow (River Wensum), alone during construction; and
- Change in ground and/or surface water chemistry and/or siltation, alone during construction and in combination during operation with the JCS and NATS as a result of increased road and bus traffic near or crossing over the River Wensum.

B.4.40 The information provided suggests that significant effects are likely and that an Appropriate Assessment (Section 4 below) should be carried out.

C. Stage 1 Outcomes

C.1 Screening Matrix

C.1.1 The European Sites included within the Applicant's assessment are:

- River Wensum SAC

C.1.2 Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below.

C.1.3 Matrix Key:
✓ = Likely significant effect cannot be excluded

X = Likely significant effect can be excluded

C = construction

O = operation

D = decommissioning

C.1.4 Where effects are not applicable to a particular feature they are greyed out.

Table 3.1: Stage 1 Matrix A: River Wensum SAC

Name of European site: River Wensum SAC												
Distance to proposed Scheme 0.215 km												
European site features	Likely Effects of proposed Scheme											
	Change in groundwater levels			Change in water chemistry			Change in water flow			Siltation		
	C	O	D	C	O	D	C	O	D	C	O	D
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	n/a	n/a	n/a	✓b	✓b	n/a	✓c	✓c	n/a	✓d	✓d	n/a
White-clawed Crayfish	n/a	n/a	n/a	✓b	✓b	n/a	✓c	✓c	n/a	✓d	✓d	n/a

Name of European site: River Wensum SAC												
Bullhead	n/a	n/a	n/a	✓b	✓b	n/a	✓c	✓c	n/a	✓d	✓d	n/a
Brook Lamprey	n/a	n/a	n/a	✓b	✓b	n/a	✓c	✓c	n/a	✓d	✓d	n/a
Desmoulin's Whorl Snail	✓a	✓a	n/a	✓b	✓b	n/a	✓c	✓c	n/a	✓d	✓d	n/a
European site features	Likely Effects of proposed Scheme											
	Noise and vibration			Artificial light and shade			Loss of channel habitat			Removal of riparian vegetation		
	C	O	D	C	O	D	C	O	D	C	O	D
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	n/a	n/a	n/a	Xf	Xf	n/a	Xg	Xg	n/a	Xh	Xh	n/a

Name of European site: River Wensum SAC												
White-clawed Crayfish	Xe	Xe	n/a	Xf	Xf	n/a	Xg	Xg	n/a	Xh	Xh	n/a
Bullhead	Xe	Xe	n/a	Xf	Xf	n/a	Xg	Xg	n/a	Xh	Xh	n/a
Brook Lamprey	Xe	Xe	n/a	Xf	Xf	n/a	Xg	Xg	n/a	Xh	Xh	n/a
Desmoulin's Whorl Snail	Xe	Xe	n/a	Xf	Xf	n/a	Xg	Xg	n/a	Xh	Xh	n/a

C.2 Stage 1 Matrix Evidence to Support Conclusions

C.2.1 Decommissioning has not been considered as there is sufficient uncertainty with regards to whether the road would be decommissioned at any time in the future. Such a plan would be subjected to a Habitats Regulations Assessment, taking into account the baseline conditions at such a time in the future that may differ markedly from the current baseline condition.

C.2.2 a. European site feature (Desmoulin's whorl snail) is considered to be present within the zone of influence (see Section 2.4.1) and is sensitive to changes in groundwater levels (Killeen & Moorkens, 2003). Section 2.4.2.2 states that "groundwater flow is from the northeast to the southwest towards the River Wensum but that locally there is an apparent divergence of ground flow in the vicinity of the first 1000m of the NDR. Drawing: Depth of Groundwater in Appendix A shows that overall flow is towards the River Wensum from the east and northeast across which the NDR will be located." Therefore the location of the NDR across the existing groundwater flow could have a likely significant effect on groundwater flow to the River Wensum SAC and the habitats that support the feature sensitive to changes in groundwater levels.

C.2.3 b. All of the European site features are considered to be present within the zone of influence (see Section 2.4.1) and are sensitive to changes in water chemistry (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003; Killeen & Moorkens, 2003). Section 2.4.2.2 states that "in periods of very high and intense rainfall surface water flow does occur and runs across the golf course towards the main river channel, but rarely actually reaches the river channel itself." Therefore a potential pathway for contaminants to move from the location of the NDR to the River Wensum has been identified. Furthermore key off-route roads at the western end of the NDR, which may have increased traffic volumes as a result of the operation of the NDR, have been observed as having no significant drainage and sediment ingress points have been identified; as detailed in Appendix B and in drawing: Existing Road Drainage and Sediment Ingress Points in Appendix A. Therefore the NDR could have a likely significant effect on water chemistry in the River Wensum SAC that supports the feature sensitive to changes in water chemistry.

C.2.4 c. All of the European site features are considered to be present within the zone of influence (see Section 2.4.1) and are sensitive to changes in water flow (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003; Killeen & Moorkens, 2003). Water flow in the River Wensum is influenced by surface water and groundwater draining to the river. Water

flow could be affected by severance of surface water bodies draining to the river, interception of the chalk water table or reduction in surface water infiltrating to the water table. Therefore the changes to the volume or rate of surface water or groundwater supply to the river could have a likely significant effect on water flow to the River Wensum SAC and the habitats that support the sensitive feature.

C.2.5 d. All European site features (except Desmoulin's whorl snail) are considered to be present within the zone of influence (see Section B.4) and are sensitive to siltation (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003). Section B.4 states that "in periods of very high and intense rainfall surface water flow does occur and runs across the golf course towards the main river channel, but rarely actually reaches the river channel itself." Therefore a potential pathway for sediment to move from the location of the NDR to the River Wensum has been identified. Furthermore key off-route roads at the western end of the NDR, which may have increased traffic volumes as a result of the operation of the NDR, have been observed as having no significant drainage and sediment ingress points have been identified; as detailed in Appendix B and in drawing: Existing Road Drainage and Sediment Ingress Points in Appendix A. Therefore the NDR could have a likely significant effect on habitats in the River Wensum SAC that support the features sensitive to siltation.

C.2.6 e. The construction and operational footprint of the NDR will be almost entirely north of the existing A1067 (Section B.3 and as detailed in drawing: General Arrangements in Appendix A). Natural England, as detailed in Appendix C, considers the distance between the NDR and the River Wensum to be such that the impacts of noise to be de minimus in relation to the European site features.

C.2.7 f. The construction and operational footprint of the NDR will be almost entirely north of the existing A1067 (Section B.3 and as detailed in drawing: General Arrangements in Appendix A). The distance between the NDR and the River Wensum is such that there will be no shading effects. Natural England, as detailed in Appendix C, considers the distance between the project and the River Wensum to be such that the impacts of artificial lighting to be de minimus in relation to the European site features.

C.2.8 g. The construction and operational footprint of the NDR will be almost entirely north of the existing A1067 (Section B.3 and as detailed in drawing: General Arrangements in Appendix A). No works will be undertaken in the river channel.

C.2.9 h. The construction and operational footprint of the NDR will be almost entirely north of the existing A1067 (Section B.3 and as detailed in drawing: General Arrangements in Appendix A). No works will be undertaken on riparian vegetation.

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D. Stage 2 Appropriate Assessment

D.1 Step 1: Information Required

D.1.1 Information required for the Appropriate Assessment is presented in Table D.1. Where known or available the required information together with details of the Natura 2000 site described in Chapter B.4 is included in the Appropriate Assessment below.

Table D.1 Information Required for Appropriate Assessment

Information about the project	**Known/Available?**
Full characteristics of the project which may affect the site	Section A.3.2
The total range or area the project will cover	Section A.3.2 Appendix G1
Size and other specifications of the project	Section A.3.2
The characteristics of existing, proposed or other approved projects or plans which may cause interactive or cumulative impacts with the project being assessed and which may affect the site	Section A.3.2
Planned or contemplated nature conservation initiatives likely to affect the status of the site in the future	Section B.4
The relationship (e.g. key distances etc.) between the project and the Natura 2000 site	Section B.2 Table B.17
The information requirements (e.g. EIA/SEA) of the authorisation body or agency	Section A.2 Planning Inspectorate, 2012
Information about the site	
The reasons for the designation of the	Section B.4

Natura 2000 site	
The conservation objectives of the site and the factors that contribute to the conservation value of the site	Section B.4
The conservation status of the site (favourable or otherwise)	Section B.4
The existing baseline condition of the site	Section B.4
The key attributes of any qualifying habitats or species on the site	Section B.4
The physical and chemical composition of the site	Coombes et al, 2007
The dynamics of the habitats, species and their ecology	Hatton-Ellis & Grieve, 2003; b) Holdich, 2003; c) Tomlinson & Perrow, 2003; d) Maitland, 2003; e) Killeen & Moorkens, 2003
Those aspects of the site that are sensitive to change	Table B.20
The key structural and functional relationships that create and maintain the site's integrity	Coombes et al, 2007
The seasonal influences on the key habitats or species on the site	Hatton-Ellis & Grieve, 2003; b) Holdich, 2003; c) Tomlinson & Perrow, 2003; d) Maitland, 2003; e) Killeen & Moorkens, 2003
Other conservation issues relevant to the site, including likely future natural changes taking place	Coombes et al, 2007

D.2 Step 2: Impact Prediction

Construction

D.2.1 During construction the potential impacts to the River Wensum would be from:

- Change in groundwater levels and change in water flow (River Wensum);
- Generation of highly turbid surface waters that could enter the River Wensum via overland flow (e.g. following a major summer storm, or prolonged winter rainfall); and
- Spillages to ground surface of any contaminating substance which could move through groundwater flow or by overland flow to enter the River Wensum.

Change in groundwater levels and change in water flow (River Wensum)

D.2.2 There are no ditches or other surface water drainage features which would be severed or otherwise affected by the NDR that are hydrologically connected to the River Wensum. Therefore there would be no direct impact on surface water flow to the River Wensum.

D.2.3 The River Wensum receives a significant proportion of low flows (and normal flow) from groundwater flow via the chalk water table. The NDR would not intercept the chalk water table and thus will not divert or otherwise interfere with the groundwater flow into the river from the chalk aquifer.

D.2.4 The proportion of the chalk aquifer catchment providing baseflow to the River Wensum that is under the footprint of the NDR is very small in relative terms i.e. the road surface area would be approximately 27 m x 1900 m = c. 0.05 km2, compared to a total chalk aquifer catchment of about 478 km2. Whilst the NDR would create an impermeable surface in an area where recharge to the chalk naturally occurs all road run-off will be directed into drainage that discharges into swales or infiltration ponds and the resulting net loss of recharge is likely to extremely low (and almost impossible to quantify). Taken together, the very small proportion of aquifer affected and the net loss through recharge, the overall impact on recharge is not considered to be significant.

D.2.5 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes to the volume

of flow in the River Wensum is not reasonably foreseeable during construction (or operation) of the NDR.

Generation of highly turbid surface waters

D.2.6 The local topography means there is an existing barrier, the A1067 Fakenham Road, between the majority of the site and the River Wensum. Most of the surface water run-off from the construction footprint will naturally drain away from the River Wensum. Therefore the majority of construction activity will not pose a risk that silt laden run-off could run directly into the River Wensum.

D.2.7 Some works along the first 300m of the road will require topsoil clearance in a location where some run-off could move towards the River Wensum if permitted to do so. There is 215m between these proposed working areas and the River Wensum which are covered with grass and other vegetation – these form part of the golf course. Routine run-off from this part of the working area would naturally infiltrate the soil normally, but if surface water does not infiltrate the soil suspended sediment would be filtered out by vegetation over such a distance (215m) before it could reach the flood plain (or the main channel). Temporary drainage arrangements (ditches) would be installed as appropriate to manage run-off from the working area.

D.2.8 The replacement of the existing gas main, crossing the road at approximately chainage 1100, would require clearance of approximately the top two metres of soil. The water level at this site is approx. 14mBGL (metres below ground level) therefore digging works less than two metres below ground level would not impact the groundwater quality or flow. Routine run-off would be managed as described above.

D.2.9 A particularly severe winter storm could potentially overwhelm any temporary drainage, and substantial suspended sediment could leave the site, although the quantity is not reasonably foreseeable. However, in such a storm there would be substantial suspended sediment leaving the land across the whole catchment and the turbidity of the River Wensum would be very high. Thus it is highly unlikely that any significant additional suspended sediment load in relative terms would arise from the working area. The entry of turbid water from the site would be limited in duration (probably less than 48 hours).

D.2.10 Summer storms can be very intense but generally occur over a period of an hour or two. Rainfall from summer storms generally is evaporated or transpired, but can infiltrate into the ground. Verbal evidence from the golf course owner indicates surface overflow only occurs in winter after prolonged

rainfall. Nevertheless, an intense summer storm during construction work could generate significant run-off from the working area which would carry substantial amounts of suspended sediment with it. If such a storm overwhelmed the site drainage system and flowed towards the River Wensum the discharge would have to traverse the vegetated area to the flood plain and much of the sediment is likely to be filtered out before it could reach the main channel. However, this may not occur in all situations, so it is concluded that during an intense summer storm there is the potential for suspended sediment to enter the river over a short duration (less than a few hours).

D.2.11 It is proposed that all surface water run-off from this part of the site would be directed (through temporary drainage arrangements) into the low lying area away from the River Wensum and the golf course. In this way no run-off from the site would be able to gain direct access to the flood plain. Steps will be taken to ensure that run-off from the existing road (which can gain access to the flood plain) will also be directed into the low lying area thereby ensuring no run-off from the proposed working area could accidentally gain access to the flood plain. A safety barrier against the risk of run-off moving towards the River Wensum will comprise of appropriate silt fence and straw bale barrier and will be installed during construction along the first 300m of the NDR between the route and the River Wensum. The detailed specification will be based on the design set out in CIRIA 648, Control of Water Pollution from Linear Construction Projects, Section 18.6, (2006).

D.2.12 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes in water chemistry and increased siltation in the River Wensum following the generation of highly turbid surface water is not reasonably foreseeable during construction of the NDR.

Spillages to ground surface

D.2.13 Spillages from any working area would be limited in scale and thus controllable. No fuel storage or other substances that could harm the River Wensum features will be held in storage that could run-off into the flood plain. Standard best practice requires no refuelling within an area of 20 to 50m from watercourses – as the construction footprint is 215m from the river the risks from fuels and other substances held on site reaching the River Wensum after a spill are considerable negligible.

D.2.14 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes in water chemistry and increased siltation in the River Wensum is not reasonably foreseeable from accidental spillages during construction of the NDR.

D.2.15 The proposed route lies between Attlebridge Landfill and the River Wensum, however the NDR would not intercept the pollution plume or groundwater levels in this area. Therefore, there would not be an increased risk of groundwater contamination resulting from construction (or operation) of the project.

D.2.16 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from contaminated groundwater reaching the River Wensum is not reasonably foreseeable during construction of the project.

Operation

D.2.17 During operation the potential impacts to the River Wensum would be from:

- High intensity rainfall causing highly turbid water to bypass the standard drainage system and enter the main channel of the River Wensum through overland flow;
- Road run-off during ‘normal’ operating conditions entering groundwater through the proposed soak-away drainage system and then moving to the River Wensum via groundwater flow, and;
- Accidental spillages entering groundwater through the proposed soak-away drainage system and then moving to the River Wensum via groundwater flow.

Proposed drainage

D.2.18 The road drainage system would be designed to transmit a 1:10 year event without causing flooding on the road carriageway. If a more severe event occurs the road carriageway is permitted to flood, but the infiltration ponds and the drainage network capacity are sized so that run-off from up to a 1:100 year event is able to be stored until it is discharged.

D.2.19 Normal road run-off is potentially polluting as it contains numerous heavy metals and hydrocarbons (or their associated combustion products). Discharges of routine run-off to surface water and groundwater will flow

through a three tiered treatment system. Each treatment stage reduces the concentration of contaminants present in the road run-off to different degrees, as defined in DMRB Volume 11, Part 10 HD45/09 (hereafter referred to as HD45/09).Run-off will flow through a grassed swale then discharge to a lined settlement pond, followed by an infiltration pond (if discharging to groundwater). The direction of water flow in the grass swales will direct surface water run-off in to Lagoon 1 as detailed in drawing: Solid and Drift Geology in Appendix A.

D.2.20 The NDR drainage will be as follows:

- From chainage -142m to around chainage 390 m on the north side will be a grassed (unlined) swale to drain both sides of the carriageway. From chainage 390 m to around chainage 1000 m on the north side will be kerbs and gullies to drain the northern carriageway.
- Between chainage 560 m and 1665 m there will be a bitumen channel located in the central reserve.
- Between chainage 780 m and 1670 m on the south side will be a grassed (unlined) swale draining the southern carriageway.
- The roundabout on the A1067 Fakenham Road will be drained via kerbs and gullies.
- All of these outfall into a lined lagoon, which is then piped to an adjacent infiltration lagoon (Lagoon 1, south of the carriageway). Between the lined pond and the infiltration lagoon will be a location for sandbag damming in case of major pollution incident. An emergency weir is also proposed between the lined lagoon and the infiltration lagoon.
- A ditch to the north of the carriageway intercepts overland flow (i.e. it does not deal with drainage from the road itself) outfalling into Lagoon 1A.

D.2.21 It is therefore predicted that an improvement is likely from the current situation whereby road drainage is uncontrolled and water or spillages simply leave the road at any point along the verge.

Impact of intense rainfall

D.2.22 All road drainage would flow to the new infiltration lagoon at chainage 600 (Lagoon 1). Lagoon 1 will be designed to accommodate the run-off from a 1:100 year rainfall event and capacity within the freeboard to contain a 1:10

year follow on storm. The lie of the land at chainage 600 is such that a large volume of water could be stored outside of the lagoon in this area before it would overflow beyond the existing road. Thus, the proposed drainage is considered secure and highly unlikely to permit run-off to move towards the flood plain in any uncontrolled manner.

D.2.23 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes in water quality and increased siltation following intense rainfall is not reasonably foreseeable during operation of the NDR.

Road run-off during 'normal' operating conditions

D.2.24 There remains a risk of run-off affecting the river quality by infiltrating into the ground and then moving to the river as groundwater flow. The River Wensum is a chalk fed river, and during periods of low flow it is safe to assume all the flow in it is derived from groundwater (the Broadland River CAMS indicates that the river has a high baseflow with a high contribution of chalk baseflow).

D.2.25 It is during periods of low flow that the water quality in the river is most at risk of contamination to significant levels as there is less dilution capacity in the river. Therefore the assessment of risks posed from the road run-off is considered only for low flow periods.

D.2.26 Using HD45/09 it is possible to calculate the potential run-off from the highway for the 1 year 24 hour rainfall event. Assuming a maximum carriageway width of 27 m, 1900m of contributing carriageway to both discharge infiltration ponds, a 24 hour rainfall depth of 8.5mm (fromHD45/09) and only 50% run-off (as required in HD45/09 as it is conservative in terms of potential for diluting contaminants) the anticipated run-off would be about 218.03m3 over a 24 hour period. The point of discharge for the run-off is going to be via an infiltration pond so there is potential for contamination in the run-off to enter the groundwater. Natural barriers exist in the unsaturated zone that will attenuate any contaminants in the infiltrating water. The borehole logs in the area indicate there are silt and clay layers overlying the chalk. These will hinder the movement of contaminants through them, and some substances will not move past them (e.g. ion exchange will occur and some adsorption will also cause some metals to be held in the unsaturated zone). The infiltrating water will mix with groundwater in the chalk, leading to dilution of any contaminants as the groundwater moves away. However, the chalk is fractured and the movement of any infiltration could move rapidly through the

aquifer if it encountered a substantial fracture below an infiltration pond. Therefore whilst there could be a lot of attenuation through the unsaturated zone and dilution and dispersion in the aquifer itself the safest assessment would assume it might arrive at the river relatively unaltered.

D.2.27 To assess this it would be appropriate to assume the run-off entered the River Wensum directly. HD45/09 allows assessments of risks to surface water from road run-off entering the river directly using the Highways Agency Water Risk Assessment Tool (HAWRAT, Method A). The method of assessment takes a two-step approach to the assessment. In Step 1, HAWRAT predicts the statistical distribution of key pollutant concentrations in untreated and undiluted highway runoff (worst case scenario) and is reported as a 'pass' (no predicted short-term impact associated with road runoff) or 'fail' (unacceptable impact and further assessment required). In Step 2, HAWRAT uses details of the highway catchment draining to the outfall, the flow rate of the receiving watercourse and the physical dimensions of the watercourse to calculate the available dilution of soluble pollutants and potential dispersion of sediments. A further comparison with pollutant thresholds is then made.

D.2.28 The traffic density (recorded as average annual daily traffic – or AADT) is estimated to be no more than 20112 vehicles (two way traffic) in 2032. The low flow condition (using the Q95 as the flow for assessment) for the River Wensum, at Costessey Mill's, is 1.277m3/s HAWRAT Step 1 and Step 2 results indicate that the quantities of both soluble substances (copper and zinc) and sediment entering surface water are acceptable (see Error! Reference source not found.). This judgement does not allow for dilution and attenuation in the groundwater, or attenuation of contaminants in the unsaturated zone as well which would occur and mean the reduction in the quantity of each contaminant before it reaches the river would be even greater than calculated here.

D.2.29 To look at the potential dilution provided by groundwater below Lagoon 1, an estimate of flow in the aquifer has been made using Darcy's Law, the result shows flow down to the River Wensum is about 4800m^3/d (100 times the Rro calculated earlier). This is based on the following:

- A flow width of about 300m (the width perpendicular to the direction of flow plus some minor additional width for some lateral dispersion in flow);
- A transmissivity (T) of about 2500m^2/d (this is an assumption – based on CAMs report that T is about 3500m^2/d in the River Wensum valley and about 1000m2/d in the interfluve areas); and

- A hydraulic gradient of 10/270 (taken from the 1976 groundwater contours on the Hydrogeological Map of the area).

D.2.30 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes in water quality during 'normal' operating conditions is not reasonably foreseeable during operation of the NDR.

Accidental Spillage

D.2.31 The drainage system will be designed to capture any spillages. This will include total containment prior to run-off entering the infiltration ponds (as described earlier in this section). Therefore spillages from accidents will not be permitted to infiltrate into the groundwater through the drainage ponds.

D.2.32 An assessment has been made using the HD45/09 method for calculating the risks of spillages and pollution incidents occurring. The return period for a spillage on the first 300m of road that resulted in pollution is calculated to be about 1:62,457 years. The return period for a spillage at the Fakenham Road roundabout and 100m of road either side is 1:11,235 and between chainage 300 and 1900 is 1:40,153 years. The cumulative spillage risk return period is 1:7710. The normal acceptable return period in road design is 1:100.

D.2.33 It is therefore concluded that an adverse impact (attributable to the NDR) on the integrity of the River Wensum SAC resulting from changes in water quality following an accidental spillage is not reasonably foreseeable during operation of the NDR.

D.2.34 Road use on other roads

D.2.35 NCC and EA are working together to reduce the effects of roads which have been identified to increase siltation in the River Wensum. This work is on-going although there is agreement on general principles to reduce the potential for silty run-off from roads to enter the River Wensum.

D.2.36 River Wensum sediment ingress points have been identified in a report by Natural England (2006). Locations of ingress points and sediment type are detailed in drawing: Existing Road Drainage and Sediment Ingress Points in Appendix A). Sediment types identified include silt, fines and sand/fines, which are likely sourced from arable field and road verge run-off. The silt is primarily a direct result of run-off from adjacent farmland; the issue is not one that is linked to the presence or absence of the NDR. Secondary sources of

silt could include erosion of the edge of roads by vehicles. However this is only likely to arise where sufficient traffic drives on the verges so that grass and other vegetation are lost.

D.2.37 The NDR is required to supplement the historic pattern of routes serving the northern part of Norwich, which is inadequate to serve the diverse pattern of movements generated by the growing modern city that gives rise to inappropriate levels of traffic in residential areas and rural lanes. The NDR will supplement existing routes serving the northern part of Norwich and it is not reasonably foreseeable that the NDR will generate an overall increase in traffic on key routes crossing the River Wensum in isolation from the growth of Norwich. Taking this into account the potential adverse effects of road traffic on key routes crossing the River Wensum is given below (Table 4.2).

D.2.38 The effect of the project considers the potential increased traffic and the risks associated with these on roads in the vicinity of the first 1300m of the project. The following roads have been identified (in scoping phase) as key off route roads along this first section of the project:

- Marl Hill Road;
- Weston Hall Road;
- Ringland Road;
- Taverham Lane; and
- Costessey Lane.

D.2.39 The traffic flows from the proposed housing allocation is included in the NDR traffic model. Traffic forecasts have been prepared that reflects the current Greater Norwich Development Partnership Joint Core Strategy Joint Core Strategy (JCS) and includes the spatial allocation of developments in line with the JCS. Table D.2 shows that the three roads with a potential direct link to the River Wensum have either major reductions in traffic in 2032 (Ringland Road and Taverham Lane) or a slight increase in level of traffic crossing the River Wensum (Costessey Lane) when compared to the do minimum scenario. Both of the two nearby roads show increases in AADT (Marl Hill Road and Weston Hall Road). Weston Hall Road is predicted to have a 6.4% increase in traffic by 2032, it is located to the west of the existing A1067 but has no direct link to the River Wensum. Marl Hill Road is predicted to have a 43.5% increase in traffic by 2032, it is located to the west of the existing A1067 but has no direct link to the River Wensum. Of the roads with a direct

link with the River Wensum all are estimated to have a major reduction in traffic except for Costessey Lane, which is estimated to have a slight increase of 1.5%. Thus the impact on the River Wensum from traffic on nearby roads with a direct link with the River Wensum would be strongly beneficial compared to the do minimum scenario. The reduction in AADT will reduce contaminant loads, risks of spillages and, most importantly in relation to sediment generation, the potential erosion of road verges.

Table D.2 Average Annual Daily Traffic (AADT) on key routes near to and crossing the River Wensum

	2017		**2032**		
Location	**Do Minimum**	**Do Something (% difference)**	**Do Minimum**	**Do Something (% difference)**	**Link to River Wensum**
Weston Hall Road	3383	3490 (+3.2%)	3279	3488 (+6.4%)	No direct link
Marl Hill Road	1674	3317 (+49.5%)	3146	5568 (+43.5%)	No direct link
Ringland Road	4907	3454 (-42.0%)	7973	6262 (-27.3%)	Bridge crossing between Ringland and Taverham
Taverham Lane	5723	4727 (-21.1%)	6199	4741 (-30.75%)	Bridge crossing between Taverham and Costessey Park
Costessey Lane	3951	3758 (-5.1%)	4771	4845 (+1.5%)	Bridge crossing between

					Costessey Mill

D.3 Step 3: Conservation Objectives

River Wensum SAC

D.3.1 With regard to the natural habitats and/or species for which the site has been designated;

D.3.2 Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

D.3.3 Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

Integrity of Natura 2000 site(s)

D.3.4 A summary of the adverse impact on site integrity is given below in Table 4.3.

Impacts acting alone

D.3.5 Many units of the River Wensum are not in favourable condition. Unit 53, the closest to the NDR, is in unfavourable declining condition due to:

- Inappropriate water levels;

- Inappropriate weirs dams and other structures;
- Invasive freshwater species;
- Water abstraction;
- Water pollution - agriculture/run-off; and
- Water pollution – discharge.

D.3.6 A river restoration strategy has been developed by Coombes et al (2007) for the whole river with the aim of returning the River Wensum to a naturally functioning system. This would be achieved through the creation of pools and riffles, narrowing sections of the channel creating natural variations in the channel locally and creating important areas of habitats.

D.3.7 Taking the precautionary approach it has been assumed that all five features of the River Wensum SAC are present within the zone of influence. Assessing the potential impacts of the NDR alone, adverse effects on the River Wensum SAC are not reasonably foreseeable because:

- Baseline hydrological connectivity (surface water) will be unaffected because no ditches or surface drains will be severed;
- Baseline hydrological connectivity (groundwater) will be unaffected because the NDR does not intercept the chalk water table or significantly reduce surface water infiltration to the water table;
- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible (limited/short duration input if any) following implementation of temporary construction work area drainage (including silt fence and straw bale barrier);
- The hydrological pathway for potential contaminants entering groundwater is unaffected because the NDR does not intercept groundwater levels or the pollution plume from Attlebridge landfill;
- Accidental spillages during construction of potential contaminants (if any) will be contained, removed and monitored in accordance with the Site Environment Management Plan;
- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible

following implementation of the operational drainage design elements (kerbs, gullies, grass swales, oil interceptors, lined lagoon, infiltration lagoon); and

- Accidental spillages during operation of potential contaminants (if any) will be contained within the operational drainage design elements and an additional sandbag damming facility.

Impacts acting in combination

Greater Norwich Development Partnership Joint Core Strategy

D.3.8 There is the potential for policies in the JCS to act in combination with the NDR that would result in an adverse effect on the integrity of the River Wensum SAC. Change in groundwater levels can be excluded on the basis of the assessment above in Section D.2 and the measures proposed in the Anglian Water - Water Resources Management Plan. Adverse effects on the River Wensum SAC from increased sediment input generated from road traffic on key routes crossing the River Wensum are not reasonably foreseeable. This is because the projected major reduction of traffic on nearby roads with a direct link with the River Wensum would be strongly beneficial compared to the do minimum scenario. The reduction in AADT will reduce contaminant loads, risks of spillages and, most importantly in relation to sediment generation, the potential erosion of road verges.

Table D.3 Summary of adverse impacts on site integrity

Does the project have the potential to:	
Cause delays in progress towards achieving the conservation objectives of the site?	No
Interrupt progress towards achieving the conservation objectives of the site?	No
Disrupt those factors that help to maintain the favourable conditions of the site?	No
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No
Cause changes to the vital defining aspects (e.g. Nutrient balance) that determine how the site functions as a habitat or	No

ecosystem?	
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?	No
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No
Reduce the area of key habitats?	No
Reduce the population of key species?	No
Change the balance between key species?	No
Reduce diversity of the site?	No
Result in disturbance that could affect population size or density or the balance between key species?	No
Result in fragmentation?	No
Result in loss or reduction of key features (e.g. Tree cover, tidal exposure, annual flooding, etc.)?	No

D.4 Step 4: Mitigation Measures

D.4.1 Measures incorporated in the NDR design are considered to be sufficient to avoid adverse effects on the integrity of the River Wensum SAC and its qualifying features. The construction and operation of the NDR including the positioning of site compounds and the diversion of the high pressure gas main would not alter hydrological connectivity of the River Wensum.

D.4.2 A Construction Environmental Management Plan would be developed and implemented in order to effectively manage ecological issues during construction. A mitigation measures matrix is provided below in Table D.4.

Table D.4 Summary of adverse impacts on site integrity

Appropriate Assessment: Mitigation measures			
List measures to	**Explain how the**	**Explain how the**	**Provide evidence**

be introduced	measures will avoid the adverse effects on the integrity of the site	measures will reduce the adverse effects on the integrity of the site	of how they will be implemented and by whom
Temporary drainage arrangements (ditches) would be installed as appropriate to manage run-off from the working area	Will direct surface water to low lying areas away from the golf course and River Wensum thus avoiding potentially contaminated and sediment laden surface water entering the River Wensum	N/A	As part of the CEMP to be implemented by the construction contractor
Silt fence and straw bale barrier would be installed during construction between the NDR and the River Wensum for the first 300m of the NDR route	N/A	Will trap suspended sediment in surface water run-off in the event that temporary drainage arrangements fail thus reducing potential load entering the River Wensum	As part of the CEMP to be implemented by the construction contractor
Site Environmental Management Plan to establish management and monitoring procedure for accidental spillages on site during construction works	Containment of spillage, removal of contaminated soil and removal by appropriate best practice methods	N/A	As part of the CEMP to be implemented by the construction contractor
Bitumen channel in the centre and	Will direct surface water to contained	N/A	NCC to operate and maintain under duty

grassed (unlined) swales to the north, draining the northern and southern carriageways respectively. The roundabout on the A1067 Fakenham Road will be drained via kerbs and gullies. All of these outfall, , into a lined lagoon, which is then piped to an adjacent infiltration lagoon (Lagoon 1, south of the carriageway). A ditch to the north of the carriageway intercepts overland flow (i.e. it does not deal with drainage from the road itself) outfalling into Lagoon 1A.	lagoons away from the golf course and River Wensum thus avoiding potentially contaminated and sediment laden surface water entering the River Wensum		as highways authority
Sandbag damming; located between the lined lagoon and the infiltration lagoon (1).	Containment of major pollution incident thus reducing the risk of contaminants entering the River Wensum	N/A	NCC to operate and maintain under duty as highways authority

E. Stage 2 Outcomes

E.1 Screening Matrix

E.1.1 Likely significant effects have been identified for the following sites:

- River Wensum SAC

E.1.2 These sites have been subject to further assessment in order to establish if the proposed Scheme could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key:

✓ = Adverse effect on integrity cannot be excluded

X = Adverse effect on integrity can be excluded

C = construction

O = operation

D = decommissioning

E.1.3 Where effects are not applicable to a particular feature the matrix cell is greyed out.

Name of European site: River Wensum SAC															
Distance to proposed Scheme 0.215 km															
European site features	Adverse effect on integrity														
	Change in groundwater levels			Change in water chemistry			Change in water flow			Siltation			In combination		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	n/a	n/a	n/a	Xb	Xb	n/a	Xc	Xc	n/a	Xd	Xd	n/a	Xe	Xe	n/a
White-clawed Crayfish	n/a	n/a	n/a	Xb	Xb	n/a	Xc	Xc	n/a	Xd	Xd	n/a	Xe	Xe	n/a
Bullhead	n/a	n/a	n/a	Xb	Xb	n/a	Xc	Xc	n/a	Xd	Xd	n/a	Xe	Xe	n/a

Name of European site: River Wensum SAC															
Brook Lamprey	n/a	n/a	n/a	Xb	Xb	n/a	Xc	Xc	n/a	Xd	Xd	n/a	Xe	Xe	n/a
Desmoulin's Whorl Snail	Xa	Xa	n/a	Xb	Xb	n/a	Xc	Xc	n/a	Xd	Xd	n/a	Xe	Xe	n/a

E.2 Screening Matrix Evidence to Support Conclusions

E.2.1 Decommissioning has not been considered as there is sufficient uncertainty with regards to whether the road would be decommissioned at any time in the future. Such a plan would be subjected to a Habitats Regulations Assessment, taking into account the baseline conditions at such a time in the future that may differ markedly from the current baseline condition.

E.2.2 a. European site feature (Desmoulin's whorl snail) is considered to be present within the zone of influence (see Section 2.4.1) and is sensitive to changes in groundwater levels (Killeen & Moorkens, 2003). Adverse effect on site integrity can be excluded because:

- Hydrological connectivity (groundwater) will be unaffected because the NDR does not intercept the chalk water table (see Section 2.4.2.2) i.e. ground levels within the first 1200m of the project route are between 17.5 and 28m AOD compared with groundwater levels between 9 and 10.5 m AOD. Furthermore the NDR will not significantly reduce surface water infiltration to the water table (see Section 4.2.1.1) because the chalk aquifer catchment equates to approximately 478km2 compared with a road surface over the first 1900m of the project route of 0.01 km2.

E.2.3 b. All of the European site features are considered to be present within the zone of influence (see Section 2.4.1) and are sensitive to changes in water chemistry (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003; Killeen & Moorkens, 2003). Adverse effect on site integrity can be excluded because:

- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible (limited/short duration input if any) following implementation of temporary construction work area drainage (including silt fence and straw bale barrier) (as described in Section 4.2.1.2);
- The hydrological pathway for potential contaminants entering groundwater is unaffected because the NDR does not intercept groundwater levels or the pollution plume from Attlebridge landfill (as described in Section 4.2.1.1);
- Accidental spillages during construction of potential contaminants (if any) will be contained, removed and monitored in accordance with the Site Environment Management Plan (as described in Section 4.2.1.3);

- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible following implementation of the operational drainage design elements (kerbs, gullies, grass swales, oil interceptors, lined lagoon, infiltration lagoon) (as described in Section 4.2.2.1 to 4.2.2.3); and
- Accidental spillages during operation of potential contaminants (if any) will be contained within the operational drainage design elements and an additional sandbag damming facility (as described in Section 4.2.2.4).

E.2.4 c. All of the European site features are considered to be present within the zone of influence (see Section 2.4.1) and are sensitive to changes in water flow (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003; Killeen & Moorkens, 2003). Adverse effect on site integrity can be excluded because:

- Baseline hydrological connectivity (surface water) will be unaffected because no ditches or surface drains will be severed (as described in Section 4.2.1.1); and
- Baseline hydrological connectivity (groundwater) will be unaffected because the NDR does not intercept the chalk water table (see Section 2.4.2.2) or significantly reduce surface water infiltration to the water table (see Section 4.2.1.1).

E.2.5 d. All European site features (except Desmoulin's whorl snail) are considered to be present within the zone of influence (see Section 2.4.1) and are sensitive to siltation (Hatton-Ellis & Grieve, 2003; Holdich, 2003; Tomlinson & Perrow, 2003; Maitland, 2003). Adverse effect on site integrity can be excluded because:

- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible (limited/short duration input if any) following implementation of temporary construction work area drainage (including silt fence and straw bale barrier) (as described in Section 4.2.1.2);
- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible following implementation of temporary construction work area drainage (including silt fence and straw bale barrier) (as described in Section 4.2.1.1); and

- The hydrological pathway for potentially contaminated and/or sediment laden surface water to move from the NDR to the River Wensum is negligible following implementation of the operational drainage design elements (kerbs, gullies, grass swales, oil interceptors, lined lagoon, infiltration lagoon) (as described in Section 4.2.2.1 to 4.2.2.3).

E.2.6 e. The projected major reduction of traffic on nearby roads with a direct link with the River Wensum would be strongly beneficial compared to the do minimum scenario. The reduction in AADT will reduce contaminant loads, risks of spillages and, most importantly in relation to sediment generation, the potential erosion of road verges.

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G. Appendices

G.1 Appendix 1: Drawings

MMD-233906-DT-0717

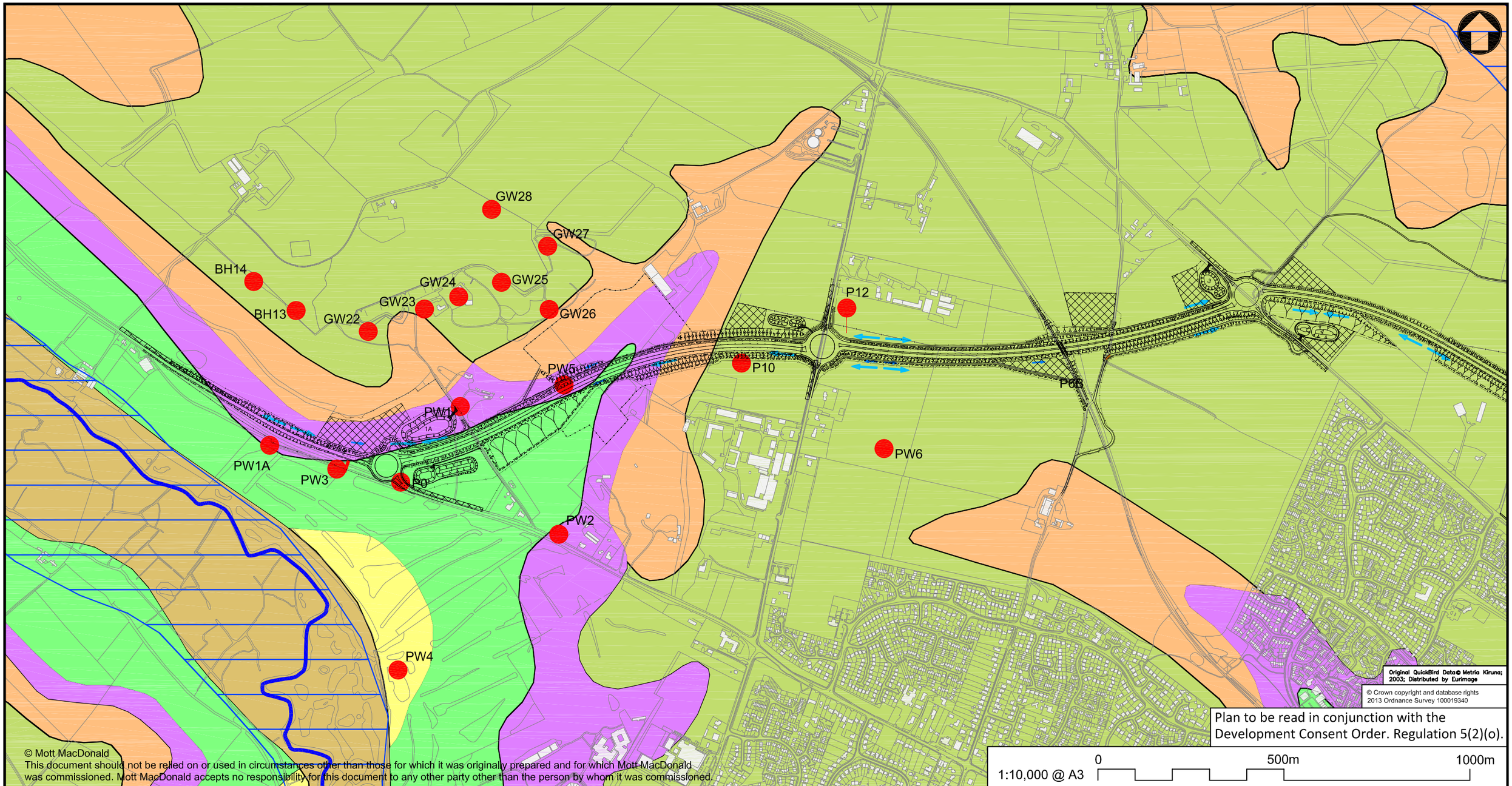
MMD-233906-DT-0718

MMD-233906-DT-0719

MMD-233906-DT-0721

MMD-233906-DT-0722

MMD-233906-DT-0815



	Watercourse		Ditch Flow Direction	RECENT:		PLEISTOCENE:		CRETACEOUS:	
	River Valley / Fluvial Floodplain		Swale Flow Direction		Alluvium		Brickearth (Corton Formation (Undifferentiated))		Upper Chalk Formation
	Proposed Infiltration Ponds				River Terrace Deposits		Glacial Sands and Gravels (Corton and Lowestoft Formation (Undiff.))		
							Crag		

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Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	AW	Revision for Submission	TF	SA

Title

Norwich Northern Distributor Road
Solid and Drift Geology
Along the NDR Route

1 of 1

Drawn	AW
Checked	TF
Approved	SA
Scale at A3	1:10,000
Drawing Number	MMD-233906-DT-0717
Rev	0
Status	INF

P:\Norwich\MM Projects\233906 - NDR 2007\233906-DT-01 NDR ES 2012-13 - Drawings\00 - Working Drawings\09 - Geology & Soils\MMD-233906-DT-0717-Rev0 Solid and Drift Geology.dwg Dec 2, 2013 - 10:15AM wor44127

GW28
GW27
BH14
GW24
GW25
GW23
BH13
GW22
GW26
PW5
Chainage: 1001
P12
Chainage: 1759
P10
Chainage: 1460
P6B
Chainage: 2407
PW1
Chainage: 704
PW1A
Chainage: 120
PW6
Chainage: 1875
PW3
Chainage: 306
P0
Chainage: 479
PW2
Chainage: 808
PW4
Chainage: 505

Borehole	River Vally / Fluvial Flooplain
Attlebridge Landfill	Watercourse

Plan to be read in conjunction with the Development Consent Order. Regulation 5(2)(o).

1:10,000 @ A3 — 0 — 500m — 1000m

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Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	AW	Revision for Submission	TF	SA

Title

Norwich Northern Distributor Road
Borehole Location Map

1 of 1

Drawn	AW
Checked	TF
Approved	SA
Scale at A3	1:10,000
Drawing Number	MMD-233906-DT-0718
Rev	0
Status	INF

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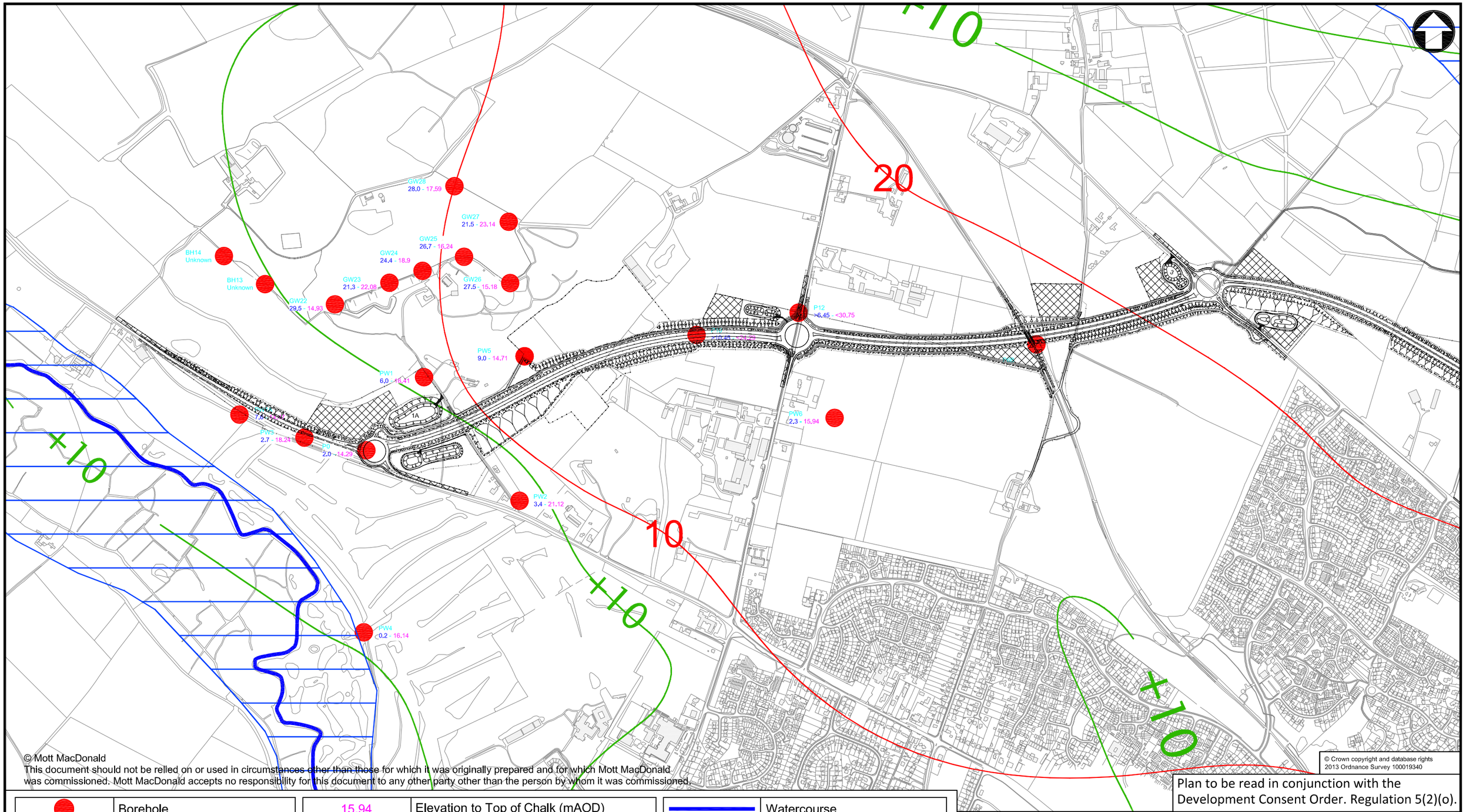

Plan to be read in conjunction with the Development Consent Order. Regulation 5(2)(o).

●	Borehole	15.94	Elevation to Top of Chalk (mAOD)		Watercourse
2.3	Depth to Top of Chalk (mBGL)	10	Chalk Groundwater Contour (1976 data)		River Valley / Fluvial Floodplain

1:10,000 @ A3

0 500m 1000m

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Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	AW	Revision for Submission	TF	SA

Title

Norwich Northern Distributor Road
Depth to Top of Chalk

1 of 1

Drawn	AW
Checked	TF
Approved	SA
Scale at A3	1:10,000
Drawing Number	MMD-233906-DT-0719
Rev	0
Status	INF

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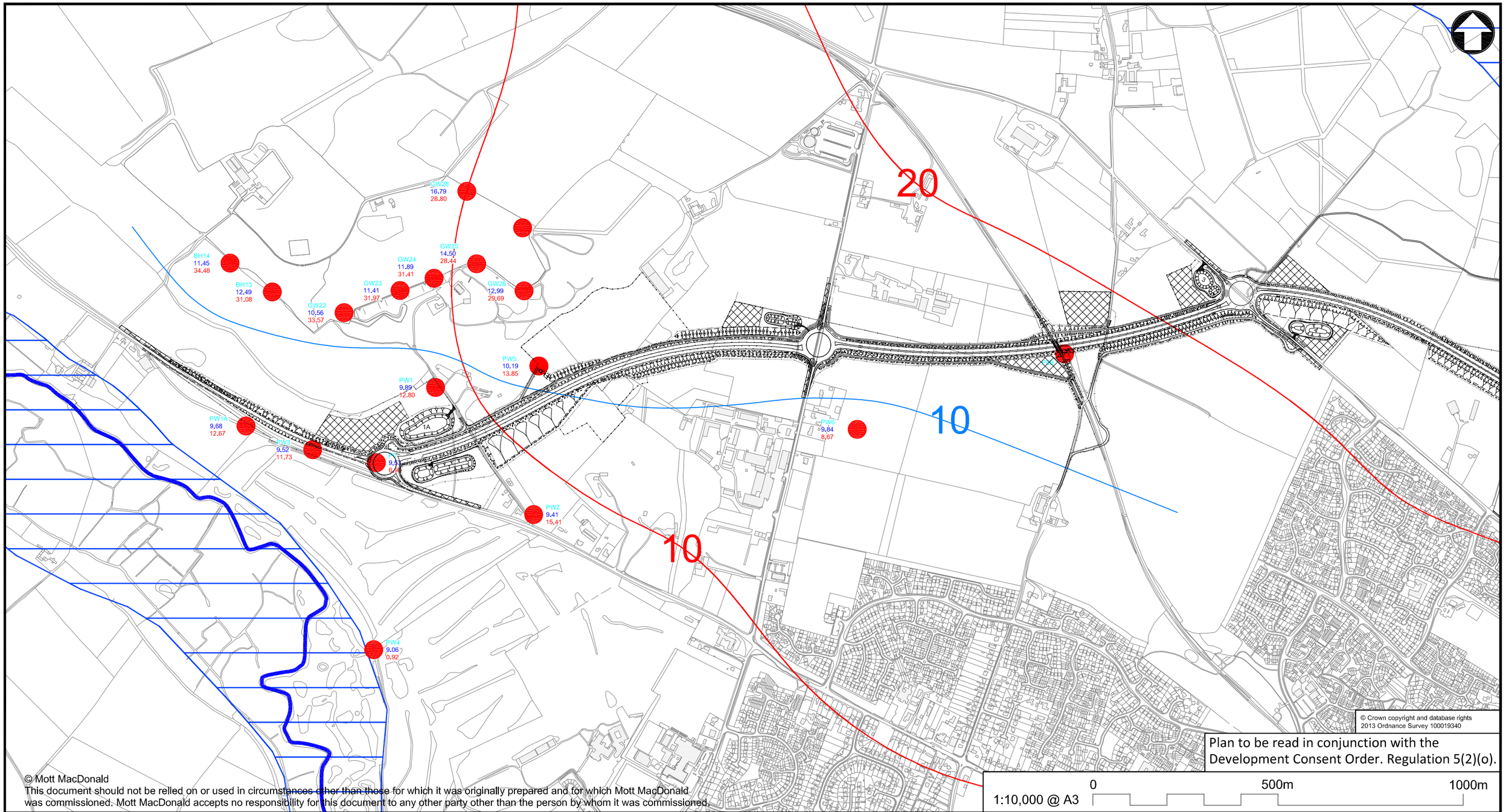

Plan to be read in conjunction with the Development Consent Order. Regulation 5(2)(o).

1:10,000 @ A3

0 500m 1000m

	Borehole
2.3	Average Groundwater Elevation (mAOD)
2.3	Average Groundwater Depth (mBGL)
10	Chalk Groundwater Contour (2007 Data) (mAOD)
10	Chalk Groundwater Contour (1976 Data) (mAOD)
	Watercourse
	River Valley / Fluvial Floodplain

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0	11/13	AW	Revision for Submission	TF	SA

Title

Norwich Northern Distributor Road
Depth to Groundwater

1 of 1

Drawn	AW
Checked	TF
Approved	SA
Scale at A3	1:10,000
Drawing Number	MMD-233906-DT-0721
Rev	0
Status	INF

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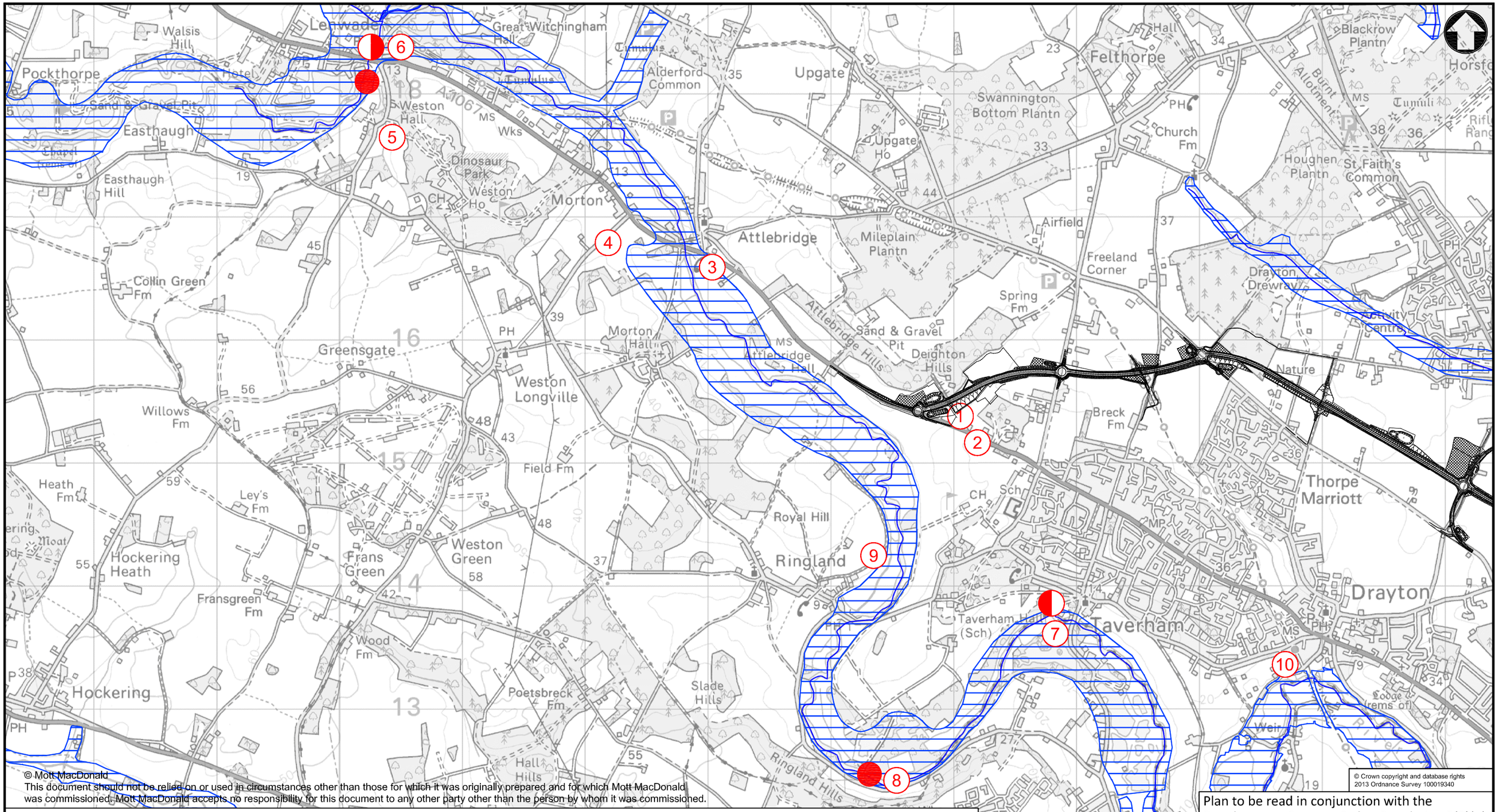

Plan to be read in conjunction with the Development Consent Order. Regulation 5(2)(o).

5	Road Drainage Target Notes (Appendix B)
	Fine Sediment Ingress Point
	Sand and Fine Sediment Ingress Point
	Silt Ingress Point
	Watercourse
	River Valley / Fluvial Floodplain

1:30,000 @ A3

0 1500m 3000m

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Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	AW	Revision for Submission	TF	SA

Title

Norwich Northern Distributor Road
Existing Road Drainage and Sediment Ingress Points

1 of 1

Drawn	AW
Checked	TF
Approved	SA
Scale at A3	1:30,000

Drawing Number: MMD-233906-DT-0722

Rev: 0

Status: INF

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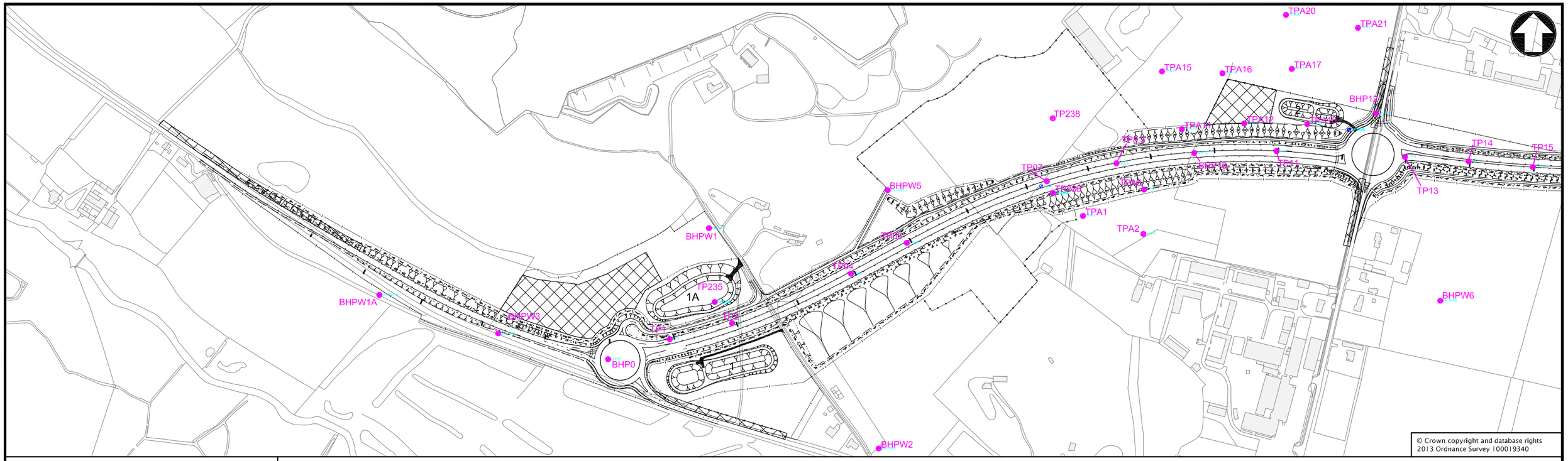
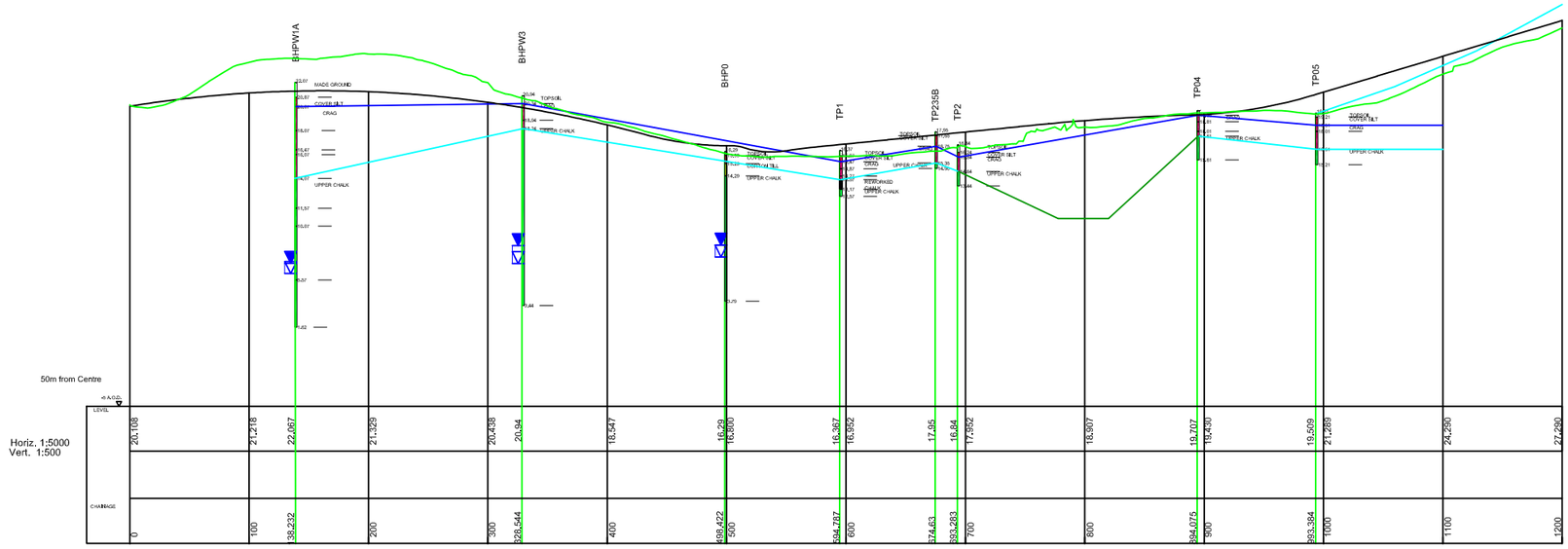


KEY:

- TOPSOIL
- ALLUVIUM
- GLACIAL SAND AND GRAVEL
- GLACIAL SAND & GRAVELS (CORTON FORMATION SAND)
- BRICKEARTH (CORTON FORMATION TILL)
- CRAG
- UPPER CHALK
- CHALK (1976 HYDROGEOLOGICAL MAP)
- NDR

KEY: WATERSTRIKE

- INITIAL WATERSTRIKE LEVEL
- SETTLED WATERSTRIKE LEVEL AFTER APPROX. 20 MINUTES



Plan to be read in conjunction with the Development Consent Order. Regulation 5(2)(o).

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Norfolk County Council

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	AW	Revision for Submission	BD	SA

Title: Norwich Northern Distributor Road
Geological Long Section
Within 50m of NDR

1 of 13

Drawn	AW
Checked	BD
Approved	SA
Scale at A3	NTS
Drawing Number	MMD-233906-DT-0815
Rev	0
Status	INF

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G.2 Appendix 2: Road Drainage Survey

Table G.1 Road Drainage Survey Notes

Fakenham Road at Deighton Hills	
	No drainage features along south/north verge of A1067 opposite Deighton Hills track, only grassed verges. Further west down A1067 the southern verge was grassed with a shallow ditch behind hedgerow. Further west again the southern boundary is bunded.
Fakenham Road at Golf Course	
	The course slopes down to the river from Fakenham Road. No field drainage in place to control runoff from golf course. Extreme rainfall would reach the river untreated, and lighter rainfall will seep into the ground before it reached the river (Info given by Mr Todd). There is evidence of water features being created as part of golf course landscaping works in the flood plain. Not sure how these link into the main river channel.

Fakenham Road at Morton Bridge	 
	Fakenham Road crosses two streams and the River Wesum at this point. There was a 3m wide concrete verge along the bridge verges with gulley pots in the approach to the bridge on both sides. Direct discharge of surface runoff from the road into the Wensum. Otter faeces and a potential otter holt identified by the bridge.
Marl Hill Road	
	Gully pots were observed for the first 100m from Fakenham Road, at the roads low point. Beyond this there were grass verges with small drainage lagoons, carved into the bunded verges.

Weston Hall Road	 
	Very silty verges. Grass bund verge approx. 0.5 metre high with trees. Work was being undertaken on grass verges during site visit due to recent flood event. Drainage mainly consists of soil trenches cut into the verge going under the fencing and the water going straight into a fairly fast flowing stream.
Porters Lane	 
	Gully pots were installed at the road's edge, closest to the river. These were heavily silted up. Between the road and the river, approx. 35m, there was an area of overgrown grasses and hedges which were potential storage areas for surface runoff.

Taverham Lane	 
	Drainage is a mix of gulley pots and runoff onto road verge. The road drains lead to a concrete interceptor and then to a partially lined gully. These then outfalls directly into the River Wensum. The length from drain to river is about 10 metres.
Costessey Lane towards Ringland	 
	Drainage consisted of gully pots which appeared to lead into an unlined ditch and the outfall ultimately to the River. Due to overgrown vegetation it was not possible to identify where there was an interceptor present.

Ringland Road at bridge crossing	 
	Observations taken from river crossing: There were no drainage features. Road runoff indirectly reaches the river by flowing over fields or infiltrates into the soil. Small meandering brook flowing into river through adjacent field.
Costessey Lane at Costessey Mill Sluice	 
	No drainage features. Road runoff flows onto road verges and then could flow into river.

G.3 Appendix 3: Consultation Response

Norfolk County Council
Planning and Transportation Department
County Hall
Martineau Lane
Norwich
Norfolk NR1 2 SG

Your Ref: R1C093/JAC
7 June 2006

For the attention of Ms J Cantell, Senior Landscape Architect

Dear Ms Cantell

Norwich Northern Distributor Road (NNDR): River Wensum SAC

Assessment Scoping Information

Thank you for your letter of 15 May 2006 seeking English Nature's opinion with regard to Norfolk County Council's (NCC) first sieve to refine the issues which need to be considered within the appropriate assessment.

English Nature supports the approach taken by NCC of identifying potential adverse impacts in relation to each of the European features, and then assessing the activities relevant to the preferred route in accordance with this.

However, there is an element that is missing. As discussed at our meeting of 12 April 2006, there should only be one appropriate assessment carried out in relation to a given plan or project. Regulation 52 of the Conservation (Natural Habitats & c.) Regulations 1994 indicates the coordination that is necessary where more than one Competent Authority is involved in carrying out an appropriate assessment. These provisions apply where a plan or project requires the consent, permission or other authorisation of more than one Competent Authority. At our meeting of 12 April, NCC agreed to identify all the permissions that would be necessary in order for the construction of the NNDR. Once this list has been drawn up NCC should seek advice from any other Competent Authorities that may have decision making responsibilities in relation to the NNDR. Only then can NCC in its capacity as lead Competent Authority confirm that all possible likely significant effects have been identified in relation to each of these permissions, and hence can confirm that Table

2 fully represents the likely significant effects of the project in relation to the European features of the River Wensum SAC.

In relation to Table 1, we suggest a number of amendments to ensure that the table is fully comprehensive.

- Both crayfish and bullhead would be affected by removal of riparian vegetation as this provides important cover.
- Noise and lighting could have an impact on the European features, as suggested in PPG23.

In relation to Table 2, we have the following comments:

- Given the distance between the River Wensum SAC and the proposed development, the impact of noise and lighting are likely to be de minimus in relation to the European features.
- 'Operation' should include provisions for accidents and spillages as well as normal highway runoff.
- 'Change in water chemistry' should take account of spillages and accidents in relation to construction and operation. It should also give consideration to impacts as a result of hydrocarbons, salt and suspended solids.
- The appropriate assessment should include consideration of silt ingress to the river, both during construction and during operation.

Please contact me should you wish to discuss this further.

Yours sincerely

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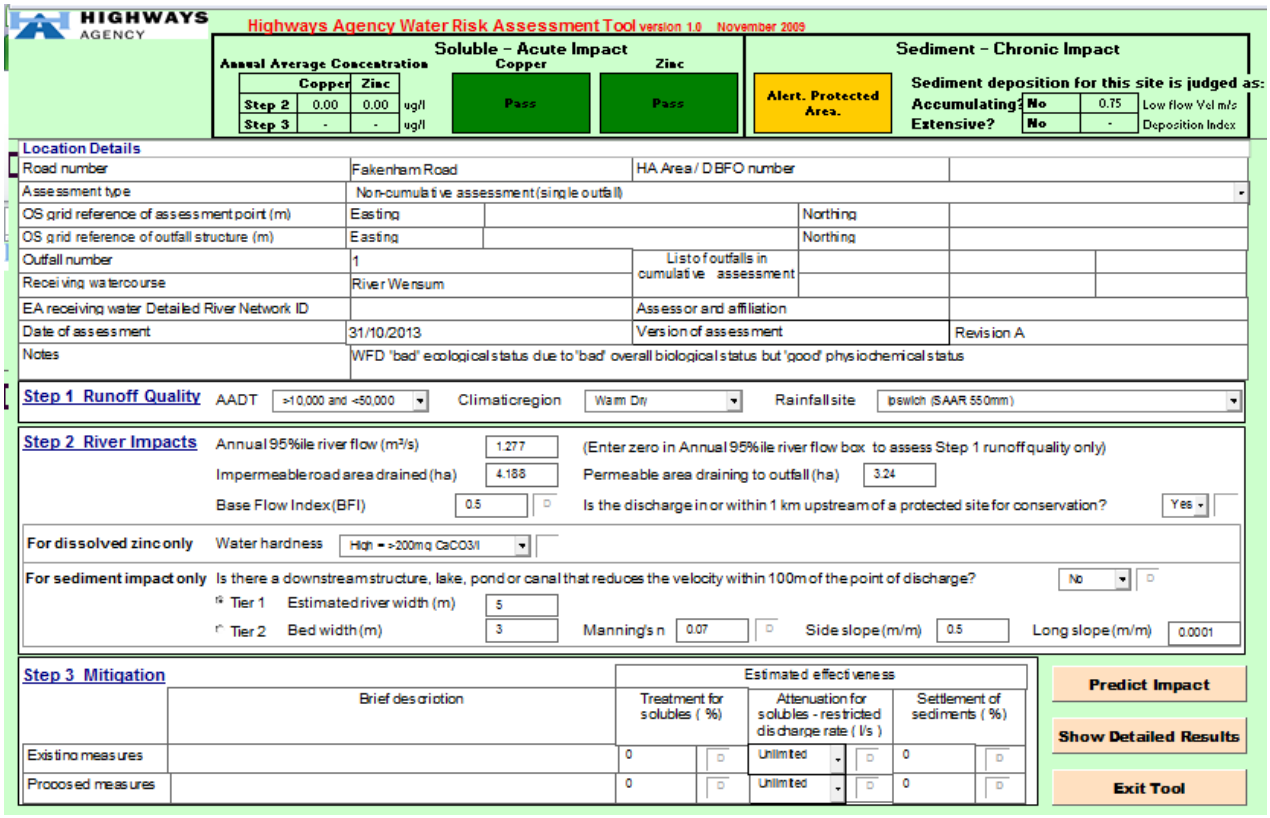
G.4 Appendix 4: DMRB Risk Assessments

Figure G.1 HAWRAT - Assessment of Risk of road runoff on the River Wensum



HIGHWAYS AGENCY — Highways Agency Water Risk Assessment Tool version 1.0 November 2009

Soluble – Acute Impact	Annual Average Concentration Copper	Zinc		Copper	Zinc
	Step 2	0.00	0.00	ug/l	Pass	Pass
	Step 3	-	-	ug/l		

Sediment – Chronic Impact: Alert. Protected Area. — Sediment deposition for this site is judged as: Accumulating? No 0.75 Low flow Vel m/s; Extensive? No - Deposition Index

Location Details					
Road number	Fakenham Road		HA Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting		Northing		
OS grid reference of outfall structure (m)	Easting		Northing		
Outfall number	1	List of outfalls in cumulative assessment			
Receiving watercourse	River Wensum				
EA receiving water Detailed River Network ID		Assessor and affiliation			
Date of assessment	31/10/2013	Version of assessment	Revision A		
Notes	WFD 'bad' ecological status due to 'bad' overall biological status but 'good' physiochemical status				

Step 1 Runoff Quality: AADT >10,000 and <50,000; Climatic region Warm Dry; Rainfall site Ipswich (SAAR 550mm)

Step 2 River Impacts: Annual 95%ile river flow (m³/s) 1.277 (Enter zero in Annual 95%ile river flow box to assess Step 1 runoff quality only); Impermeable road area drained (ha) 4.188; Permeable area draining to outfall (ha) 3.24; Base Flow Index (BFI) 0.5; Is the discharge in or within 1 km upstream of a protected site for conservation? Yes

For dissolved zinc only: Water hardness High = >200mg CaCO3/l

For sediment impact only: Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No

Tier 1 Estimated river width (m) 5

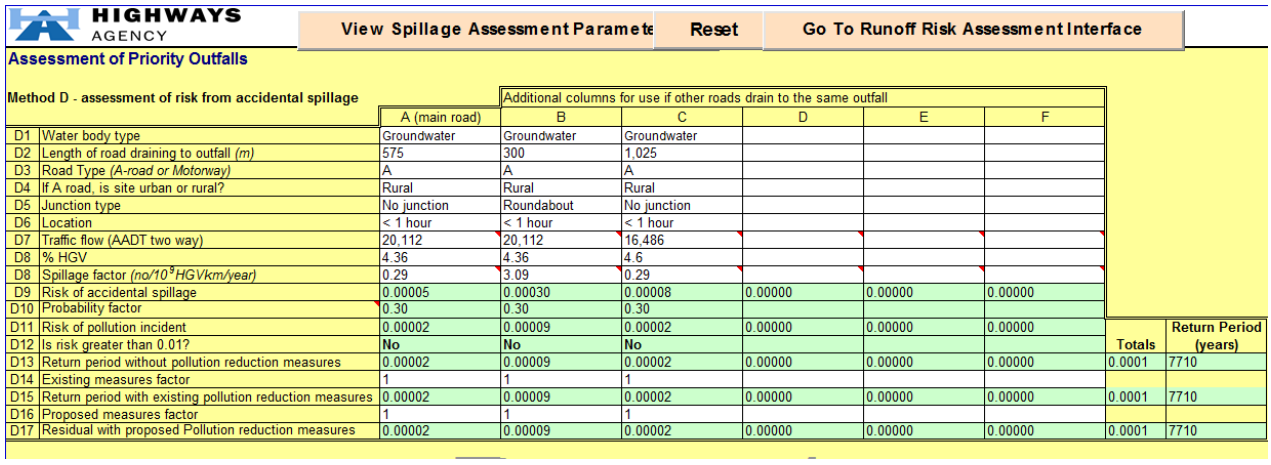
Tier 2 Bed width (m) 3; Manning's n 0.07; Side slope (m/m) 0.5; Long slope (m/m) 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)	Attenuation for solubles - restricted discharge rate (l/s)	Settlement of sediments (%)
Existing measures		0	Unlimited	0
Proposed measures		0	Unlimited	0

Predict Impact | Show Detailed Results | Exit Tool

Figure G.2 Spillage Risk Assessment - Groundwater



HIGHWAYS AGENCY — View Spillage Assessment Parameters | Reset | Go To Runoff Risk Assessment Interface

Assessment of Priority Outfalls

Method D - assessment of risk from accidental spillage

		A (main road)	Additional columns for use if other roads drain to the same outfall: B	C	D	E	F	Totals	Return Period (years)
D1	Water body type	Groundwater	Groundwater	Groundwater					
D2	Length of road draining to outfall *(m)*	575	300	1,025					
D3	Road Type *(A-road or Motorway)*	A	A	A					
D4	If A road, is site urban or rural?	Rural	Rural	Rural					
D5	Junction type	No junction	Roundabout	No junction					
D6	Location	< 1 hour	< 1 hour	< 1 hour					
D7	Traffic flow (AADT two way)	20,112	20,112	16,486					
D8	% HGV	4.36	4.36	4.6					
D8	Spillage factor *(no/10^9HGVkm/year)*	0.29	3.09	0.29					
D9	Risk of accidental spillage	0.00005	0.00030	0.00008	0.00000	0.00000	0.00000		
D10	Probability factor	0.30	0.30	0.30					
D11	Risk of pollution incident	0.00002	0.00009	0.00002	0.00000	0.00000	0.00000		
D12	Is risk greater than 0.01?	No	No	No					
D13	Return period without pollution reduction measures	0.00002	0.00009	0.00002	0.00000	0.00000	0.00000	0.0001	7710
D14	Existing measures factor	1	1	1					
D15	Return period with existing pollution reduction measures	0.00002	0.00009	0.00002	0.00000	0.00000	0.00000	0.0001	7710
D16	Proposed measures factor	1	1	1					
D17	Residual with proposed Pollution reduction measures	0.00002	0.00009	0.00002	0.00000	0.00000	0.00000	0.0001	7710