

Habitats Regulation Assessment

Joint Core Strategy for Broadland, Norwich and South Norfolk

February 2010

Greater Norwich Development Partnership

Mott MacDonald

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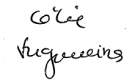
B	Sept 2009	Celia Figueira	Mark Johnston	Gerry Kelly	First Issue
C	Jan 2010	Celia Figueira	Mark Johnston	Mark Frith	Second Issue
D	Feb 2010	Celia Figueira	Mark Johnston	Mark Frith	Final Issue



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Content

Executive Summary

The Joint Core Strategy

Broadland, Norwich and South Norfolk Council are working together under the Greater Norwich Development Partnership (GNDP) to prepare the Joint Core Strategy (JCS), a framework to plan for future development in Norwich city and the surrounding area.

The JCS sets out the spatial vision for development in the Broadland, Norwich and South Norfolk areas. It will form the key document in the Local Development Framework (LDF) portfolio of planning documents for each local authority which will set out the vision, objectives and spatial strategy for future development until 2026.

Task 1 Appropriate Assessment: Likely Significant Effects

The purpose of the previous Task 1 Test Of Likely Significance (TOLS) was to review the European and Ramsar designated sites and assess whether the JCS draft policies have a likely significant effect on the European and Ramsar designated sites. The Task 1 TOLS included a detailed review of each draft policy against each of the conservation objectives of European and Ramsar designated sites. As part of the TOLS process the draft policies were revised and new policies added to ensure protection and enhancement of protected area and nature conservation assets.

Following the detailed review of the JCS and the formulation of the Task 1 TOLS screening matrix, a number of policies of the JCS were identified which could potentially result in significant effects on European and Ramsar designated sites, thus:

- Policy 3: Energy and Water;
- Policy 4: Housing;
- Policy 6: Access and transportation;
- Policy 10: Location for major new or expanding communities, and;
- Policy 12: The remainder of the Norwich urban area, including the fringe parishes.

The Task 1 TOLS also identified a number of designated sites in which it was deemed uncertain as to whether direct, indirect and in-combination effects would be significant. In accordance with EC Habitats Directive guidance, a precautionary approach is required when the impacts on designated sites is uncertain.

Task 2 Appropriate Assessment

As part of the Task 2 Appropriate Assessment process the policies of the JCS have been continuously reviewed and refined to ensure compliance with the Habitats Regulation and national guidance on biodiversity and planning. The JCS polices have evolved

through the Appropriate Assessment process to ensure that future developments within the area are sustainable and take into consideration climate change and ensure the protection of environmental assets.

With the revision of JCS policies and the inclusion of specific mitigation measures, it is deemed highly unlikely that the JCS polices would have a significant direct or indirect impact on European and Ramsar designated sites.

Uncertainty and Implementation

Uncertainty remains regarding the potential in-combination and cumulative effects associated with water resources, water efficiency, growth and tourism on European and Ramsar designated sites resulting from the planned growth within the GNDP area. This is because of the dependence on the effectiveness and implementation of the mitigation measures. However, this uncertainty can be reduced, and any significant effects avoided, through the following measures:

- The implementation of green infrastructure developments;
- The allocation of greenspace to protect specific natural assets and designated sites and implemented through Area Action Plans, and;
- The implementation of water infrastructure improvements and water efficient measures as recommended in the WCS, enforced through the AWS Water Resource Management Plan in ensuring that sufficient water supplies can be made available to meet planned growth and as supported by the Position Statements issued by AWS, Natural England and the Environment Agency.

It is important that the outcomes (the mitigations described above) are fed into Development Plan Documents (DPDs), other local development documents and resource management plans (such as the Water Resource Management Plan), to ensure proper implementation and enforcement.

A sufficient level of monitoring to determine the effectiveness and impacts of the JCS policies should be undertaken, as proposed in Policy 20 of the JCS.

Acronyms and Abbreviations

AA	Appropriate Assessment
AAP	Area Action Plan
AWS	Anglian Water Services
BATNEEC	Best Available Technology Not Entailing Excessive Costs
CAMS	Catchment Area Management Strategy
DPD	Development Plan Document
EA	Environment Agency
EU	European Union
GNDP	Greater Norwich Development Partnership
HD	Habitats Directive
HRA	Habitats Regulation Assessment
IEEM	Institute of Ecology and Environmental Management
JCS	Joint Core Strategy
LDF	Local Development Framework
NATS	Norwich Area Transportation Strategy
NE	Natural England
NCC	Norwich City Council
NNDR	Norwich Northern Distributor Road
NPA	Norwich Policy Area

NWT	Norfolk Wildlife Trust
ODPM	Office of the Deputy Prime Minister
RDB	Red Data Book
RoC	Review of Consents
RSPB	Royal Society for the Protection of Birds
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SOP	Site Options Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
TOLS	Test of Likely Significance
WCS	Water Cycle Study
WRMP	Water Resource Management Plan
WRMU	Water Resource Management Unit
WwTW	Wastewater Treatment Works
ZoI	Zone of Influence

1. Introduction

1.1 Background

Broadland, Norwich and South Norfolk Councils are working together under the Greater Norwich Development Partnership (GNDP) to prepare the Joint Core Strategy (JCS), a framework to plan for future development in Norwich city and the surrounding area.

In accordance with Article 6 paragraph (3) of the Council Directive 92/43/EEC (as amended) on the Conservation of Natural Habitats and of Wild Fauna and Flora (EC Habitats Directive), as transposed in to UK law under the Conservation (Natural Habitats etc.) Regulations 1994 (as amended), a Task 1 Appropriate Assessment: The Test of Likely Significance (Task 1 TOLS) was undertaken to identify any likely significant effects that might arise from the implementation of the JCS.

The Task 1 TOLS was submitted in April 2009 and finalised in July 2009, and identified that policies in the JCS as issued in March 2009 (Public Consultation document) had the potential for significant impacts on European designated sites.

Following the issue of the March 2009 JCS policies, the JCS policies have been reviewed to take into consideration the recommendations of the Task 1 TOLS and discussions with Natural England (NE), and are published in the September 2009 JCS Pre-submission document. Subsequently a Task 2 Appropriate Assessment (Task 2 AA) was instigated to address the outcomes from the Task 1 TOLS

A draft Task 2 AA was submitted on September 2009; however, it was considered pertinent to review this assessment in light of last findings from the Stage 2b Water Cycle Study submitted in January 2010. As such, this report is a review of the Task 2 Appropriate Assessment (issued in September 2009) to integrate the results from the Stage 2b Draft Water Cycle Study (Scott Wilson, 2010).

1.2 Objective of the Task 2 Appropriate Assessment

The purpose of this Habitats Regulation Assessment (HRA) report is to provide the necessary information to assess the potential for the JCS to affect Natura 2000 sites within or adjacent to the JCS planning area as required under the Habitats Regulations (as amended) 1994.

The Task 2 AA objective is to identify whether the integrity of the European and Ramsar designated sites may be affected by the JCS policies, and whether the conservation status of the primary interest features of the designated sites could be affected.

1.3 Process of the Task 2 Appropriate Assessment

An important part of this Appropriate Assessment process is the continuous review and revision to the policies being assessed to ensure that they are compliant with the requirements set out in the Habitats Regulations. This process has been duly followed.

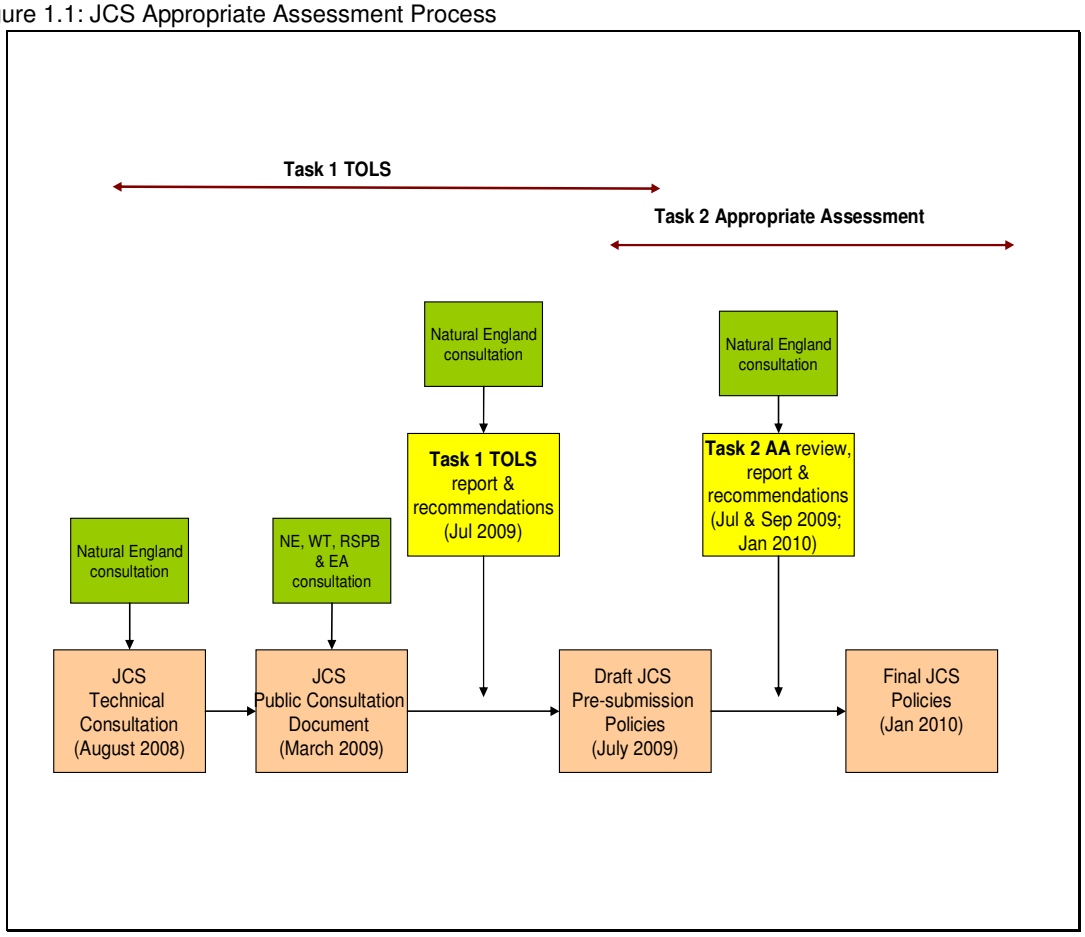
Following the completion of the Task 1 TOLS report (Mott MacDonald, 2009), additional policies were added to the JCS and the existing JCS policies were revised and updated. The new policies were then issued in the JCS pre-submission document (Sept 2009). Subsequently, a Task 2 AA process was

instigated and the new policies in the JCS pre-submission document reviewed. Following this review this Task 2 AA report has been produced, and further revisions of the JCS policies have been made. A summary of the JCS Appropriate Assessment process is presented in Figure 1.1. This Task 2 AA included:

- A review of the revised JCS policies;
- An assessment on whether the policies would have a significant direct, indirect or in-combination effect on those designated sites and qualifying features identified following the Task 1 TOLS, and;
- Consultation with Natural England on the HRA process and outcomes, and consultation with the Environment Agency & Natural England in relation to the results from the Water Cycle Study.

Where a significant impact is identified as part of the Task 2 AA, a Task 3 Alternative Options and Mitigation assessment is required.

Figure 1.1: JCS Appropriate Assessment Process



1.4 Methodology

Information on designated site condition was used, where relevant, to inform this assessment. Site conditions, with information on reasons for failure (where applicable), are published by Natural England for the SSSI components of the European designated sites.

The Department for Communities and Local Government's 'Planning for the Protection of European Sites' specific guidelines to local authorities for undertaking Appropriate Assessments for regional spatial strategies and local development documents has been followed in undertaking this Task 2 AA.

Other relevant key policies that have been considered in undertaking this Task 2 AA and in the formulation of the JCS policies are PPS1 Delivering Sustainable Development (which sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system); PPS1A Planning and Climate Change - Supplement to Planning Policy Statement 1; PPS9 Biodiversity and Geological Conservation; PPS11 Regional Spatial Strategies, and; PPS12 Local Development Frameworks.

Several plans and reports were reviewed as part of the Task 2 AA, the most important of these being:

- GNDP Water Cycle Study Stage 1;
- GNDP Water Cycle Study Stage 2b (draft);
- Green Infrastructure Strategy;
- Norwich Area Transport Strategy Implementation Plan Appropriate Assessment;
- River Wensum Restoration Strategy;
- River Basin Management Plan for the Anglian River Basin District (draft);
- Breckland LDF Appropriate Assessment;
- North Norfolk LDF Appropriate Assessment;
- Great Yarmouth LDF Appropriate Assessment;
- Norwich Northern Distributor Road Appropriate Assessment (draft), and;
- The Broads and Climate Change report.

1.5 Consultation

Consultation with key stakeholders is a key component of the Appropriate Assessment process. Under the AA guidance consultation with NE is mandatory where there is the potential for a project or plan to impact on a European designated site. NE has been formally involved for the consultation in the production of both the Task 1 TOLS and Task 2 AA of the JCS.

In addition to the formal response from NE, the consultation process also involved one to one meetings and discussions with NE (Helen Ward) and Norfolk Wildlife Trust (NWT) (John Hiskett) and a consultation and workshop undertaken on 24th April 2008 between the environmental stakeholders (NE, EA, RSPB and NWT) and the GNDP planners.

Consultation regarding specific issues associated with the Task 1 TOLS was undertaken with NE on 16th April 2009, and comments from the consultation have fed into the review of the JCS policies. Further discussion on the draft version of this Task 2 AA (Rev A of this report) and the pre-submission JCS policies were held with NE on the 16th September 2009, and comments from NE were incorporated into the First Issue (Rev B of this report) version of the Task 2 AA. Specific comments on the outcomes from the Task AA (Rev C this report) were received from Natural England (by e-mail) on the 4th April 2010. These comments, where appropriate, have been incorporated into the final version of this Task 2 report (Rev D).

In addition to the Task 2 AA, consultations undertaken as part of the Stage 2b Greater Norwich Water Cycle Study (WCS) report have relevance to the outcomes of this report. The position statements from the Environment Agency (letter dated 27th January 2010), Anglian Water Services (letter dated 28th January 2010) and Natural England (letter dated 26th January 2010) are all applicable in relation to this Habitats Regulation Assessment.

2. The Joint Core Strategy Policies

Following the Task 1 TOLS and as part of the Appropriate Assessment process, the JCS policies (and policy numbers[1]) were subsequently modified and published in the Pre-submission JCS document of September 2009.

A summary of the Pre-submission JCS policies is presented in Table 2.1 (cross-referenced with the March 2009 Public Consultation policy numbers). It is these Pre-submission JCS policies (September 2009) upon which this Task 2 AA is undertaken.

[1] All policy numbers in this report refer to the Pre-submission JCS document of September 2009

Table 2.1: Draft Policy Objectives and Numbering

	Policy Number Pre-submission Document (Sept 2009)	Policy Number Public Consultation (March 2009)	Policy Title (Sept 2009)	Policy Objective (Sept 2009)
Area wide policies	Policy 1	New: No direct equivalent, part covered by Policy 13, 15 & 17	Addressing climate change and protecting environmental assets	To address climate change and promote sustainability, all development will be located and designed to use resources efficiently, minimise greenhouse gas emissions and be adapted to a changing climate and more extreme weather.
	Policy 2	New: No direct equivalent, part covered by Policy 13	Promoting good design	All developments will be designed to the highest possible standards to create a strong sense of place.
	Policy 3	New: No direct equivalent, part covered by Policy 13 & 17	Energy and Water	Development in the area will be low or zero carbon, local renewable energy production and focus on water efficiency, subject to environmental constraints, to meet regional carbon reduction and renewable energy targets. New developments will be dependent on available water resources and protection of water quality and areas of environmental importance. This will be achieved through greater water use efficiency and by addressing environmental and capacity constrains at strategic wastewater treatment works.
	Policy 4	Policy 14	Housing delivery	Allocation will be made to ensure at least 36,740 new homes can be delivered between 2008 and 2026, of which 33,000 will be within the Norwich Policy Area.
	Policy 5	Policy 15	The economy	The economy will be developed in a sustainable way.
	Policy 6	Policy 16	Access and transportation	The transport system will be enhanced to develop the role of Norwich as a Regional Transport Node, particularly through the implementation of the Norwich Area Transportation Strategy and will improve access to rural areas.
	Policy 7	Policy 18	Supporting communities	All development will be expected to maintain or enhance the quality of life and the well being of communities.
	Policy 8	New: No direct equivalent	Culture, leisure and entertainment	The cultural offer is an important and valued part of the area.
Policies for places	Policy 9	Policy 2	Strategy for growth in Norwich Policy Area (NPA)	The NPA is the focus for major growth and development.
	Policy 10	Policy 5	Locations for major new or expanding communities in the NPA	Major growth in the Old Catton, Sprowston, Rackheath, Thorpe St Andrew growth triangle, and Cringleford, Easton/Costessey, Hethersett, Long Stratton and Wymondham, will be masterplanned as attractive, well-serviced, integrated, mixed use development using recognised design process giving local people an opportunity to shape development.

Policy Number Pre-submission Document (Sept 2009)	Policy Number Public Consultation (March 2009)	Policy Title (Sept 2009)	Policy Objective (Sept 2009)
Policy 11	Policy 3	Norwich City Centre	The regional centre role will be enhanced through an integrated approach to economic, social, physical and cultural regeneration to enable greater use of the city centre, including redevelopment of brownfield sites.
Policy 12	Policy 4	The remainder of the Norwich urban area, including the fringe parishes	The existing Norwich urban area includes the built-up parts of the urban fringe parishes of Colney, Costessey, Cringleford, Trowse, Thorpe St. Andrew, Sprowston, Old Catton, Hellesdon, Drayton and Taverham. It will be expanded through significant growth in the Old Catton, Sprowston, Rackheath, Thorpe St. Andrew growth triangle and smaller urban extensions at Cringleford and Easton/Costessey.
Policy 13	Policy 1	Main Towns	Subject to resolution of servicing constraints, these towns will accommodate additional housing, town centre uses, employment and services.
Policy 14	Policy 7	Key Service Centres	Land will be allocated for residential development. Established retail and service areas will be protected and enhanced where appropriate and local employment opportunities will be promoted.
Policy 15	Policy 8	Service Villages	Identification of service villages which will be allocated for small scale housing development subject to form and character considerations.
Policy 16	Policy 9	Other Villages	Identification of villages with defined boundaries which will accommodate infill or small groups of dwellings and small scale business or services, subject to form and character considerations.
Policy 17	Policy 10	Smaller rural communities and the countryside	In the countryside, affordable housing for which a specific local need can be shown will be permitted in locations adjacent to villages as an exception to general policy.
Policy 18	Policy 11	The Broads	In areas in close proximity to the Broads Authority area particular regard will be applied to maintaining and enhancing the economy, environment, tranquillity, setting, visual amenity, recreational value and navigational use of the Broads.
Policy 19	Policy 12	The hierarchy of centres	The development of new retailing services, offices and town centre uses as defined by government guidance.
Policy 20	Policy 19	Implementation	A co-ordinated approach will be taken to the timely provision and ongoing maintenance of infrastructure, services and facilities to support development.

3. Outcomes from the Task 1 Test of Likely Significance

3.1 Potential Impacts on Designated Sites

The purpose of the previous Task 1 TOLS was to identify the European and Ramsar designated sites which had the potential to be significantly affected in relation to the JCS policies. The Task 1 TOLS included a detailed review of each draft JCS policy against each of the conservation objectives of European and Ramsar designated sites within the area of potential impact.

Following the detailed review of the JCS and the formulation of the Task 1 TOLS screening matrix , a number of policies of the March 2009 JCS consultation report were identified which could potentially result in significant effects on European and Ramsar designated sites.

3.1.1 Direct and Indirect Effects

Potential direct and indirect effects resulting from the implementation of the JCS alone were identified and are likely as a result of:

- Land-take from housing developments;
- Increased demands on water supply and subsequent effects on ground and surface water levels and flows;
- Deterioration in water quality within watercourses, due to wastewater discharges for example, and;
- Increased disturbance resulting from increases in noise and physical disturbances at specific sites.

Subsequently the designated sites which are likely to be potentially impacted are:

- The Broads SAC: potential impacts from the implementation of Policy 10 & 12 (all habitats and the species Desmoulin's whorl snail *Vertigo moulinsiana*);
- Broadland Ramsar: potential impacts from the implementation of Policy 10 & 12 (to calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, alkaline fens, alluvial forests with Al*nus glutinosa* and *Fraxinus excelsior* and to Desmoulin's whorl snail), and;
- Broadland SPA: potential impacts from the implementation of Policy 10 & 12 to all features.

3.1.2 In-combination and Cumulative Effects

Potential in-combination and cumulative effects resulting from the implementation of the JCS were identified and are likely as a result of:

- Increased impact on sites resulting from in-combination effects associated with wastewater discharges;
- The implementation of the JCS and other plans such as Great Yarmouth LDF, Breckland LDF; Broads Plan and North Norfolk LDF which have the potential to result in increased tourism pressure on designated sites;
- Increased impact on sites resulting from in-combination effects associated with waste sites and mineral extraction operations;
- Climate change which might intensify the impacts resulting from increased abstraction and discharge;
- Increased traffic due to developments planned under policies 6 and 12.

Subsequently the designated sites which are likely to be potentially impacted are:

- Broadland SPA: potential in-combination impacts from the implementation of Policy 12 (all features) and Policy 10 (all features);
- River Wensum SAC: potential in-combination impacts from the implementation of Policy 12 (all features), Policy 12 (to water course of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation; white-clawed crayfish *Austropotamobius pallipes*, brook lamprey *Lampetra planeri* and bullhead *Cottus gobio*); and Policy 6 (all features);
- The Broads SAC: potential in-combination impacts from the implementation of Policy 12 (all features); Policy 10 (all habitat features and Desmoulin's whorl snail); and;
- Broadland Ramsar: potential in-combination impacts from the implementation of Policy 12 (all features); Policy 10 (to calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, alkaline fens, alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, alkaline fens and to Desmoulin's whorl snail and otter *Lutra lutra*); and; Policy 6 (all features).

3.1.3 Uncertain Impact

The Task 1 TOLS identified a number of designated sites in which it was deemed uncertain as to whether the direct, indirect and in-combination effects would be significant. In accordance with EC Habitats Directive guidance, a precautionary approach is required when the impacts on designated sites are uncertain. Therefore this Task 2 AA has reviewed each of the potential uncertain impacts, and those which remain uncertain have been included in this Task 2 AA (listed in table 4.1).

Those designated sites which were identified with uncertain significant impacts, but have subsequently been scoped out include:

- The Wash SPA and Ramsar;
- Breydon Water Ramsar and SPA, and;
- Redgrave & South Lopham Fens Ramsar.

Those designated sites which were identified with uncertain significant impacts, and included in this Task 2 AA were:

- Breckland SPA & SAC;
- Great Yarmouth North Denes SPA;
- Winterton - Horsey Dunes SAC;
- North Norfolk Coast SAC, SPA, and Ramsar, and;
- Norfolk Valley Fens SAC.

These designated sites have been considered and dismissed following a review of the Appropriate Assessments for their respective LDFs, as any additional impacts from the JCS alone are highly unlikely, as specified in the Task 1 AA. Further details are presented in the Task 1 TOLS (Mott MacDonald, 2009).

3.2 Summary of Policies

Subsequent to the detailed Task 1 TOLS, the following JCS policies were identified as having the potential to have significant effects on European and Ramsar designated sites:

- Policy 3: Energy and Water (which underpins Policy 10 & 12);
- Policy 4: Housing (which underpins Policy 10 & 12);
- Policy 6: Access and transportation;
- Policy 10: Location for major new or expanding communities, and;
- Policy 12: The remainder of the Norwich urban area, including the fringe parishes.

4. The Water Cycle Study

4.1 Introduction

The Water Cycle Study (WCS) was carried out to ensure that water supply, water quality, sewage and flood risk management issues can be addressed in a sustainable way for the three Local Authorities (Norwich City Council, Broadland District Council and South Norfolk District Council) to enable the growth planned to 2026 and beyond. The WCS study is required by the East of England Plan and is a key part of the evidence base for the JCS. Policy 3 of the JCS also emphasizes the need to consider the results of the WCS in assessing the available water resources and effects from Wastewater Treatment Works (WwTW) discharges.

The draft WCS was finalized in January 2010 and consists of a Stage 2b Technical Report and a Stage 2b Non-Technical Report. At Stage 2b of the WCS, each of the Potential Growth Areas (PGAs) were assessed in detail and results are most relevant in assessing impacts from proposed growth areas to European designated sites.

The outputs of WCS study include:

- A definition of the capacity and the water supply and wastewater strategy;
- The preferred wastewater and water supply strategies for the favoured options, and;
- Advice on the timing of infrastructure upgrades required to deliver the strategies for the favoured growth sites.

The information included in this Section of the Task 2 AA is a summary of the WCS (Stage 2b Water Cycle Study, Scott Wilson, 2010) findings in relation to wastewater and water supply strategies relevant to the designated sites, namely The Broads SAC, Broadland SPA and Ramsar and River Wensum SAC. This information is considered pertinent to assess Likely Significant Effects of the favoured growth option and therefore details of results for relevant Wastewater Treatment Works (WwTW) and abstraction consents are provided.

4.2 Review of Consents

The review process referred to as the Review of Consents (RoC) requires the Environment Agency (EA) to review all of the existing discharge consents or abstraction licences it has issued for both discharges and abstractions to and from rivers or groundwater. The review is to determine whether, when used to their maximum permitted level, the current licences and consents are likely to be impacting on the integrity of ecologically designated sites which became protected under the Habitats Regulation. The review of consents is due to be completed in March 2010.

At the time of undertaking the WCS Stage 2b report, the Environment Agency was in the process of consulting on its Stage 4 findings which reports on the Site Option Plan (SOP) for consents which cannot be ruled out as not impacting on designated sites.

Specifically for water resources and the WCS, the key licences being considered as part of the RoC are the abstractions direct from the River Wensum at Costessey Abstraction Point as well as from boreholes in close proximity to the Wensum located at Costessey, potentially impacting the Wensum SAC. In relation to wastewater, discharge consents for permitting discharge into the River Wensum SAC are also being considered. All current discharge consents were also assessed for impacts on sites designated under the Habitats Directive.

4.3 Wastewater Strategy

The WCS analysed the spare capacity of 14 WwTW relevant to the PGA considered in the JCS. The study concludes that there is potential for growth within the GNDP area without the need for construction of new WwTW.

The WCS needed to ensure that any solutions that are proposed will not potentially affect the River Wensum, River Yare or River Bure (as they fed into the The Broads SAC/Broadland SPA and Ramsar). To do this a model was undertaken and compliance with the following thresholds was tested:

- A minimum of 0.1 mg/l total Phosphorous or below for ditches/dykes; and
- A minimum of 0.05 mg/l total Phosphorous or below for lakes.

The results from the WCS suggest that consented flows need to be increased at Acle, Reepham, Long Stratton and Stoke Holy Cross and Whitlingham WwTWs. However only Acle, Reepham, Long Stratton and Stoke Holy Cross WwTWs need to have their quality consents tightened.

Long Stratton and Stoke Holy Cross WwTWs do not discharge to water bodies that could impact any of the designated sites. However, Reepham WwTW discharges into the Blackwater Drain which is a tributary of the River Wensum SAC, and Acle WwTW has the potential to affect the Decoy Carr SSSI and Damgate Marshes SSSI (both part of the Broads SAC/Broadlands SPA) due to discharges into the River Bure.

The results in the WCS for these two WwTWs are detailed below. All other WwTW would be operating within their current (or AMP5 proposed) flow consent and do not need to be altered as a result of the proposed growth. However, in addition to Reepham WwTW and Acle WwTW, Whitlingham WwTW has also the potential to affect the The Broads SAC, Broadland SPA and Ramsar as the WwTW discharges into the River Yare. For this reason it is included in this summary of the WCS.

4.3.1 Whitlingham WwTW

Whitlingham WwTW has currently sufficient capacity to accept additional flows from other PGAs. Its current flow consent has the larger capacity to receive and dilute treated water. Therefore, it will accept growth from all locations in the JCS area without requiring an increase in consented flow conditions. It will, however, require works to the inlet to allow for additional flow to reach the WwTW.

Although the initial assessment for the GNDP strategy suggested that the current flow consent would be exceeded by a small percentage, the AWS strategy assessment, provided subsequently, assessed a greater number of houses and suggested that there is sufficient capacity to accommodate the new proposed houses. This is due to decreasing occupancy rate in new houses and more water efficient homes. Policy 3 of the JCS makes a clear reference to the need for water efficiency solutions as means to protected water quality and important environmental areas.

Consequently, it has been assumed that the flow consent at Whitlingham will not be exceeded by the proposed growth. As a result, wastewater generated from growth under the favoured option proposal can be accommodated at Whitlingham WwTW without a change to the current consent provided that the interceptor sewers to service the PGAs. For these reasons capacity at Whitlingham WwTW will be fully utilised and, as a consequence, impacts on the receiving watercourses are likely to occur.

Mitigation measures were identified to ensure that there is no overall increase in nutrients load (phosphorus) as a result of an increase in treated wastewater flow. AWS has already identified measures

to address current water quality. These improvements are a result of the Review of Consents driven by the Habitats Regulations and Water Framework Directive.

Conclusion: No change to the existing quality consents would be required as the additional growth will not result in an increase in consented DWF. Modelling has identified that no further upgrades in process capacity are required for any determinands and no volumetric upgrades are required, apart from the ones already identified by AWS.

4.3.2 Reepham WwTW

To comply with the Habitats Regulations the WCS needs to propose measures so that any results of discharges will not result in the breach of the phosphorus thresholds for flowing waters (a maximum of 0.1 mg/l of total phosphorus) and for standing waters (0.05 mg/l of total phosphorus). For Reepham WwTW this means a phosphorus consent of 0.9 mg/l. However, according to the WCS, the current consent of 1 mg/l is likely to yield a similar result as the modelling does not account for phosphorus assimilation by plants and algae.

With a consent limit of 1mg/l of phosphorus there would be only a small increase in loading of phosphorus as a result of growth and as such would be unlikely to adversely impact on downstream sites over and above that of the current consent and is therefore considered to be sufficient to meet the requirements of the Habitats Regulation.

However, it needs to be stated that for Reepham WwTW the requirements of the WFD are no achievable under the Best Available Technology Not Entailing Excessive Costs (BATNEEC). The reason for failure lays in the fact that Reepham's consents have been calculated based on the targets of the Blackwater Drain. This drain is a small drainage watercourse with a low flow such that during summer conditions the flow is almost entirely made up of treated effluent discharge. In order to meet the instream water quality targets for the WFD during these periods, the discharge would need to be at the same concentrations as the instream targets (i.e. no dilution effects). This is not achievable with current technology (not entailing excessive costs). The WCS advises that consideration should be given to considering targets in the downstream water course i.e. The River Wensum. Therefore, maintaining the current consent at Reepham will not impose significant effects on the River Wensum water quality.

Conclusion: New quality consents will be required to accommodate growth. To comply with the Habitats Regulation consent of 0.9 mg/l (mean) would be required. This is extremely close to the current license of 1mg/l and therefore it is considered that Reepham WwTW is compliant with the Habitats Directive. However, to comply with the WFD it is considered that it would not be possible to upgrade the WwTW to achieve WFD standards within available technology (not entailing excessive costs and energy requirements).

4.3.3 Acle WwTW

This WwTW does not have a phosphorus limit in its discharge consent. According to the WCS achieving Habitats Regulation compliance is possible by achieving a 2 mg/l limit on phosphorus discharge which would ensure no increase in the overall phosphorus discharge. However, significant investment would be required to improve the treatment process to achieve the proposed limit. Nevertheless, WFD requirements will not be met, under the current proposed growth, in the River Bure. The reason for this is the fact that WFD standards for phosphorus, ammonia and BOD will not be achievable under BATNEEC

Conclusion: New quality consents will be required to accommodate growth. To comply with the Habitats Regulation requirements a P standard consent of 2 mg/l (Mean) would be required. However to comply with the WFD it is considered that it would not be possible to upgrade the WwTW to achieve phosphorus WFD standards within available technology (not entailing excessive costs and energy requirements).

4.4 Water Supply Strategy

To address the issue of availability and scarcity of water resources, the WCS analysed the extra demands which are likely to occur from the East of England Regional Spatial Strategy growth plans. Using the housing growth figures provided by GNDP, a number of demand scenarios based on different water use rates have been modelled in order to determine the increase in water demand as a result of the proposed growth in the GNDP area. In total, four different water use scenarios were modelled. The difference in total demands between the various water use scenarios is from just under 17 Ml/d (maximum increased demand) to around 10 Ml/d as a minimum by 2030/31.

The key concerns of increasing abstractions to fulfil the increase in water demand rely on the abstractions direct from the Wensum at Costessey abstraction point, as well as from boreholes in close proximity to the Wensum located at Costessey. Current abstraction licences (when used to their maximum) are already impacting the Wensum SAC by reducing available flow and water levels for the species within the 7km downstream stretch of the SAC that are reliant (directly or indirectly) on specific flow conditions. These are also being addressed under the Review of Consents driven by the Habitats Regulation. The final findings of the Review of Consents will be finalized in March 2010 only.

The conclusions drawn from first stages of the Review of Consents is that the groundwater abstractions at Costessey, in combination with the surface water abstraction direct from the River, are likely to be impacting on the integrity of the 7 km stretch of the River Wensum SAC located downstream of the abstraction point. Advice from the Environment Agency and Natural England is that there is a proposal to modify the maximum permitted abstraction volume from the licences by up to 40 Ml/d in order to allow the River Wensum to reach its environmental outcomes. This is termed as a sustainability reduction.

In summary, not only is there insufficient available water to increase abstraction but there is also a need to reduce the amount of water currently abstracted. Therefore to comply with the increase in demand there is the need to find other solutions. Available water resources were identified as:

- Increased Groundwater abstractions through existing abstraction licences (Thorpe St. Andrew Borehole);
- New Groundwater Resource Development (probably within Norwich), and;
- Whitlingham Effluent Flow compensation scheme.

Underpinning these figures in water demand is JCS (Policy 3) with the need to resource water efficiency solutions, when considering new developments, as a mean to protected water quality and important environmental areas.

4.4.1 Increased Groundwater Abstractions through Existing Abstraction Licences

The spare capacity of the existing groundwater licences has been assessed by the Environment Agency's Review of Consents. With the exception of the Costessey Groundwater Licence, no issues have been identified by the Environment Agency regarding adverse effects on European sites. It is therefore concluded that it would be acceptable in terms of ecological consequences to rely on local groundwater sources to meet demands in the future, excluding the Costessey abstraction licence.

4.4.2 New Groundwater Resource Development

A new groundwater resource development, most probably within Norwich area, will be required under all growth scenarios. Since AWS have yet to publish their final WRMP, it is not known precisely from which aquifer and within which Environment Agency's Water Resources Management Unit (as defined by the local CAMS document) the abstraction is likely to take place from. If it is assumed that the source to be developed would abstract from the deep Chalk aquifer beneath Norwich and that the groundwater source can be shown not to be connected to any European sites, and any ecological consequence of such development are likely to be small.

4.4.3 Whitlingham Effluent Flow compensation scheme

The Effluent Compensation scheme proposed within the draft WRMP (in which the EA has been involved), entails supplementing flows in the Lower River Wensum by re-distributing treated final effluent that currently discharges to the River Yare from Whitlingham WwTW and instead discharging it further up the catchment at a point just downstream of the Wensum intakes at Costessey. By doing this, AWS would hope:

- To both enhance river flows in the Lower River Wensum, and;
- To be able to abstract more from their intakes at Costessey without detrimentally reducing flows in the River downstream specifically in relation the Yare Broads and Marshes and Cantley Marshes SSSIs, which are part of the Broads SAC/ Broadlands SPA.

In principle, this scheme should provide some extra water resources. However, until further details of the proposed scheme are provided by AWS in its final WRMP, there remains some uncertainty over the wider ecological consequences. Particularly, it has to be proven that water quality in the River Wensum SAC and River Yare are not going to be significantly affected by the implementation of this measure. The WCS refers to the need to review this conclusion once the final WRMP is made available.

The Whitlingham Effluent Flow compensation scheme proposed by the AWS draft WRMP was to take Whitlingham final (treated) effluent and to discharge it downstream of the Costessey intakes. This would effectively work as a 'river augmentation scheme' whereby the river flow reducing effects of abstracting water at Costessey is 'compensated' by adding treated wastewater flow at a point just downstream. The scheme may also allow an increase in abstraction at Costessey so long as there is a commensurate increase in discharged treated effluent downstream. There also remains the possibility to discharge the treated effluent further upstream of Costessey in the Wensum, such that allowing a suitable retention time for dilution, could allow the water to be re-abstracted along with mixed river water at Costessey. This would then be classified as an 'indirect water re-use scheme'.

The use of water efficiency measures will have the potential to reduce increase in demand. Consequently this will decrease the volume of water that needs to be abstracted and the will defer the date at which the Effluent Flow compensation scheme is required.

At present, the proposed effluent compensation scheme could be considered to be both a new resource but also an innovative solution to the sustainability reduction. The WCS has shown that the increase in treated flow proposed for Whitlingham could result in dry weather discharge of over 66 Ml/d allowing plenty of transfer capacity to both compensate for the sustainability reduction and provide additional resource (up to 26 Ml/d). However, this would require a high degree of additional study to determine its suitability as an option and there remains considerable uncertainty as to the eventual solution that will be implemented. The outcomes would also depend on water efficiency and a likely shift towards water neutrality as indicated

in Policy 3 of the JCS and the Position Statement letters from the Environment Agency and Natural England on the WCS. This is therefore a matter of implementation, rather than the specific JCS Policies, as the JCS Policies have been specifically formulated to ensure sustainable growth, water efficiency and protection of natural assets.

Once the final sustainability reduction is known and the Wensum Site Option Plan (SOP) is available, the WCS should be revisited to alter the baseline of available water supply and reconsider what the water resource scheme developments will need to be implemented.

5. Task 2 Appropriate Assessment

Following the detailed review as part of the Task 1 TOLS, the JCS polices were reviewed and re-written to minimise any potential significant impacts on the European and Ramsar designated sites. The revised policies were then presented in the pre-submission JCS document (September 2009). In addition to the review of the JCS policies, other mitigation measures were considered and any outstanding Task 2 likely significance effects identified.

A summary of the Task 2 AA impacts and mitigations is presented in Table 4.1.

Table 5.1: Potential Impact and Mitigations for Key JCS Policies

An impact on the designated site is uncertain either due to insufficient information to be able to make an assessment or unknown effectiveness of the mitigations	Uncertain
A significant impact on the designated site is likely.	LSE
A significant impact on the designated site is highly unlikely, any potential effects would not be significant	NLSE

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
Policy 3 **Energy and water**	**Designated site**: Broads SAC; Broadland Ramsar & SPA. **Impacts**: Main impacts relate to the potential increase in discharges from treatment works and increased abstraction from ground and surface water sources.	**Designated sites**: Broads SAC; Broadland Ramsar & SPA; River Wensum SAC. **Impacts**: Potential additional impacts from other disturbances, gradual cumulative over-abstraction and deterioration in water quality. Climate change effects.	New policy since March 2009 document. The policy is explicit in that 'release of land for development will be dependent on there being sufficient water infrastructure to meet the additional requirements'. It also requires water efficiency measures to be implemented which will reduce water use and demand.	All sufficient water infrastructure, including any additional water abstraction, must be in compliance with the Water Framework Directive, and will rely on all abstraction licences being amended or revoked by 2015. Currently, RoC are being carried to evaluate impacts from discharges and abstraction on European designated sites. Final results will only be published in March 2010. Last version of the WCS found that, although the WFD standards cannot be achieved for some of the water bodies that receive discharges, Habitats Regulations requirements especially for phosphorus are achievable. In this case are: ■ Reepham WwTW ■ Acle WwTW. Both these WwTW need improvements made achieve phosphorus standards which are feasible under BATNEEC to achieve HD compliance (but not to achieve WFD). Water resources were addressed with focus	**Uncertain** There is the need to ensure that Whitlingham effluent flow compensation scheme is feasible and sufficient to allow for the sustainable reduction, as mentioned in the review RoC, and to ensure that the groundwater abstraction will not impact on the River Wensum SAC. Assume improvements to WwTW will be undertaken and effective in reducing phosphorus levels to required levels using BATNEEC.

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
				on the effects to the River Wensum. Increased water demand, due to growth planned under the JCS, is deemed to have negative effects on the River Wensum SAC and qualifying features (all). Greater water efficiency is required under this policy and will help in reducing the need to increase abstraction which will minimize impacts. Nevertheless, mitigation measures were investigated and the WCS results suggest these are enough to provide for the increased demand and to the sustainability reduction proposed by the Environment Agency. Proposed measures are: ■ The use of spare capacity of existing groundwater licences (excluding the Costessey licence). ■ New groundwater resource development if proved not to impact any European designated site. ■ Effluent Compensation Scheme will enhance flows in the lower River Wensum, to comply with the sustainability reduction and increased water demand, without negative effects to the European designated sites. NLSE are subject to the feasibility of all these three measures. Furthermore, regarding the Effluent Compensation Scheme, the technical feasibility of this measure needs to be proved as well as no impacts on water quality in the River Wensum due to a potential increase in nutrients load. At the time of this assessment, the full investigation on the feasibility of these measures has not been completed. Consequently the Likely Significant Effects of these measures are uncertain.	

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
Policy 4 **Housing delivery**	**Designated site**: Broads SAC; Broadland Ramsar & SPA. **Impacts**: Potential land take within 2-3 km of the designated sites. Impacts relating to increased demand in water abstraction and water discharges. Increase in disturbance from visitors and tourism pressures.	**Designated sites**: Broads SAC; Broadland Ramsar & SPA; River Wensum SAC; Breckland SPA & SAC; Great Yarmouth North Denes SPA; Winterton Horsey Dunes SAC; North Norfolk Coast SAC, SPA & Ramsar; Norfolk Valley Fens SAC. **Impacts**: Increase in visitor and tourism pressure across the area in-combination with visitor pressure in adjacent local authority areas. North Norfolk, Breckland, Great Yarmouth and the Broads authorities have all recognised potential significant impacts on designated sites resulting from increased visitor pressures within LDF areas, but Appropriate Assessments on the LDFs have not considered in-combination impacts resulting from increased population in adjacent LDF areas.	In mitigating direct and indirect impacts, this policy is underpinned by Policy 1 and 2 of the JCS to promote sustainability and all developments designed to the highest possible standards.	Investment in the green infrastructure strategy with the aim of managing visitor pressures around designated sites will be essential in assisting to reduce the impacts, but residual impacts are likely to remain. All sufficient water infrastructure, including any additional water abstraction, must be in compliance with the Water Framework Directive, and will rely on all abstraction licences being amended or revoked by 2015. Currently, RoC are being carried to evaluate impacts from discharges and abstraction on European designated sites. Final results will only be published in March 2010. Last version of the WCS found that, although the WFD standards cannot be achieved for some of the water bodies that receive discharges, HD requirements especially for phosphorus are achievable. In this case are: ■ Reepham WwTW ■ Acle WwTW. Both these WwTW need improvements made achieve phosphorus standards which are feasible under BATNEEC to achieve HD compliance (but not to achieve WFD). Water resources were addressed with focus on the effects to the River Wensum. Increased water demand, due to growth planned under the JCS, is deemed to have negative effects on the River Wensum SAC and qualifying features (all). Greater water efficiency is required under this policy and will help in reducing the need to increase abstraction which will minimize impacts. Nevertheless, mitigation measures were investigated and results the WCS results suggest these are enough to provide for the increased demand and to the sustainability reduction proposed by the Environment Agency. Proposed measures are:	**Uncertain** In-combination impacts associated with area-wide growth, resulting in increased visitor pressure on European designated sites in combination with growth in neighbouring local authority areas. Designated sites: Broads SAC; Broadland Ramsar & SPA; Breckland SPA & SAC; Great Yarmouth North Denes SPA; Winterton – Horsey Dunes SAC; North Norfolk Coast SAC, SPA & Ramsar. There is also the need to ensure that Whitlingham effluent flow compensation scheme is feasible and sufficient to allow for the sustainable reduction as mentioned in the review RoC and to ensure that the groundwater abstraction will not impact on the River Wensum. Assume improvements to WwTW will be undertaken and effective in reducing phosphorus levels to required levels using BATNEEC and overall water usage from new housing developments will be reduced. Response of River Wensum ecosystem to the hydrological changes proposed under the WCS unknown.

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
				■ The use of spare capacity of existing groundwater licences (excluding the Costessey licence). ■ New groundwater resource development if proved not to impact any European designated site. ■ Effluent Compensation Scheme will enhance flows in the lower River Wensum, to comply with the sustainability reduction and increased water demand, without negative effects to the European designated sites. NLSE are subject to the feasibility of all these three measures. Furthermore, regarding the Effluent Compensation Scheme, the technical feasibility of this measure needs to be proved as well as no impacts on water quality in the River Wensum due to a potential increase in nutrients load. At the time of this assessment, the full investigation on the feasibility of these measures has not been completed. Consequently, the Likely Significant Effects of these measures are uncertain.	
Policy 6 **Access and transportation**	**Designated sites**: Broads SAC; Broadland Ramsar; River Wensum SAC. **Impacts**: Changes in air quality and deposition onto habitats, potential additional run-off from new roads and associated infrastructure developments	**Designated sites**: Broads SAC; Broadland Ramsar; River Wensum SAC; Breckland SPA. **Impacts**: The draft Appropriate Assessment for the NDR did not determine any direct or indirect impact on the River Wensum, but potential in-combination and cumulative impacts relating to combined effects of the NDR and	In mitigating direct and indirect impacts, this policy is supported by Policy 1 and 2 of the JCS to promote sustainability and all developments designed to the highest possible standards. Need to ensure new developments associated with developments under NATS fully comply with	To minimise any potential impact of the NDR and in-combination effects, land parcels between the NDR and the River Wensum are allocated as ecological buffer zones within which no significant development is permitted. Further in-combination and cumulative impacts need to be reviewed and considered as part of individual projects under NATS, including NDR. Detailed studies regarding the impact of the A11 improvements and increased visitor pressure on the Breckland SPA remain inconclusive and further assessments are due late 2009. However, these relate to likely	**NLSE** Habitats Regulation Assessment (Task 1) on the NATS Implementation Plan was undertaken. This assessment found likely significant effects from two schemes, the NNDR and a potential Park & Ride site at Taverham, on the River Wensum SAC. A Stage 2 Appropriate

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
		local development. Potential for negative effects on Breckland SPA air quality.	national standards and best practice with the aim of reducing air pollution impacts, incorporation of SUDS, and enhancements to biodiversity. Full implementation of the green infrastructure plans to ensure long-term sustainability is essential to minimise any potential significant effects on designated sites.	direct effects, appropriate mitigations are being identified by Breckland LDF and DPD, and therefore any in-combination effects are deemed unlikely.	Assessment on the NDR and the potential Park & Ride site at Taverham is in process. Any direct, indirect and in-combination effects will then be assessments at the project level, and are not directly related to the JCS Policy.
Policy 10 **Locations for major new or expanded communities in the NPA** **&** **Policy 12** **The remainder of the Norwich urban area** (Policies are assessed together as the impact and the effect on designated sites are similar)	**Designated sites**: Broads SAC; Broadland Ramsar & SPA **Impacts**: Direct impacts from disturbance are unlikely as the main localities are outside the buffer zones established (3 km from the site boundary). The only exception is the proposed development at Rackheath which is within the green and orange buffer zones (See maps in Volume III of the Task 1 TOLS). The area which overlaps with the orange buffer (the area within 2 km from the site boundary) is insignificant when compared to the overall Broads/Broadland area and therefore any	**Designated sites**: Broads SAC; Broadland Ramsar & SPA; River Wensum SAC; Breckland SPA & SAC; Great Yarmouth North Denes SPA; Winterton – Horesey Dunes SAC; North Norfolk Coast SAC, SPA & Ramsar. **Impacts**: There is a concern that increased abstraction in the River Wensum, which feeds the River Yare, in particular the Yare Broads and Marshes SSSI (located within 1 km from Thorpe St Andrew, one of the key areas for development under these policies). As such, impacts from increased abstraction on the River Wensum have the potential to affect flows downstream on	Technological modifications will be required to ensure that that all water discharges from existing and any new treatment works are in compliance with the WFD requirements. Compliance with WFD will rely on all abstraction licences being amended or revoked by 2015. The expected increase in water abstraction due to proposed developments should be accommodated to ensure that the conservation objectives of the SAC are not affected. In mitigating direct and indirect impacts, this policy is underpinned by Policy 1 and 2 of the JCS to promote	Growth beyond 10,000 dwellings will require investment to ensure water resources are protected and operations at treatment works are compliant with requirements, notably Whitlingham, Heigham and Rackheath WTWs (as required under the area-wide Policy 3 of the JCS). To minimize potential disturbance to features of the designated sites a significant area north of Rackheath should be allocated for green space. This area is to act as an ecological buffer zone between the development area and the designated site. Currently, RoC are being carried to evaluate impacts from discharges and abstraction on European designated sites. Final results will only be published in March 2010. Last version of the WCS found that although the WFD standards cannot be achieved for some of the water bodies that receive discharges HD requirements especially for phosphorus are achievable. In this case are: ▪ Reepham WwTW ▪ Acle WwTW. Both these WwTW need improvements made achieve phosphorus standards which are	**Uncertain** There is the need to ensure that the Whitlingham effluent flow compensation scheme is feasible and sufficient to allow for the sustainable reduction as mentioned in the review RoC and to ensure that the groundwater abstraction will not impact on the River Wensum. There is a potential significant in-combination impact but this is associated with area-wide growth, and therefore covered under JCS Policy 4, rather than place specific policies 10 & 12. All other direct and indirect impacts are unlikely to be significant.

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
	potential impacts should be localized and not affect the integrity of the site. Nevertheless this should be addressed at local level. Areas for development that have the potential to increase the amount of discharge from the Whitlingham STW are, accordingly to the Water Cycle Stage 1, Sprowston (North East Sector); Cringleford South west sector; Costessey; and Drayton.	the River Wensum and indirectly affect this feature of the Broads SAC. The condition of 70% of the Yare Broads and Marshes SSSI area is currently 'unfavourable no change' and 16% of the area is 'unfavourable recovering'. The main reasons for adverse conditions are mostly related to water pollution from agriculture run off and from point discharges. Any development in this area could potentially increase phosphate loads and have a significant effect on the Broads and Wensum SAC. Developments proposed in the Rackheath area have the potential to increase volumes to the Rackheath STW. The majority (c.80%) of the Bure Broads and Marshes SSSI is in 'unfavourable no change' status, mostly due to water pollution from agriculture run off. Any increase in untreated effluent might prevent the achievement of the conservation objectives of the designated sites.	sustainability and all developments designed to the highest possible standards. This will need to include the use of best practice in managing storm run-off, water abstraction and water discharges. Full implementation of the green infrastructure plans to ensure long-term sustainability is essential.	feasible under BATNEEC to achieve HD compliance (but not to achieve WFD). Water resources were addressed with focus on the effects to the River Wensum. Increased water demand, due to growth planned under the JCS, is deemed to have negative effects on the River Wensum SAC and qualifying features (all). Greater water efficiency is required under this policy and will help in reducing the need to increase abstraction which will minimize impacts. Nevertheless mitigation measures needed to be investigated and results the WCS results suggest these are enough to provide for the increased demand and to the sustainability reduction proposed by the Environment Agency. Proposed measures are: ■ The use of spare capacity of existing groundwater licences (excluding the Costessey licence). ■ New groundwater resource development if proved not to impact any European designated site ■ Effluent Compensation Scheme will enhance flows in the lower River Wensum, to comply with the sustainability reduction and increased water demand without negative effects to the European designated sites. NLSE are subject to the feasibility of all these three measures. Furthermore, regarding the Effluent Compensation Scheme, the technical feasibility of this measure needs to be proved as well as no impacts on water quality in the River Wensum due to a potential increase in nutrients load. At the time of this assessment, the full investigation on the feasibility of these measures has not been completed. Consequently, the Likely Significant Effects of these measures are uncertain.	

JCS Policy	Potential Direct & Indirect Impact	Potential In-combination & Cumulative Impacts	Mitigations: Revision of JCS policies to avoid likely significant effects	Mitigations: Additional measures required to avoid likely significant effects	Outstanding Task 2 likely significant effect?
		Those designated sites outside the GNDP area have the potential to be impacted through an increase in visitors. Studies undertaken by the respective local authorities have identified uncertainty regarding potential significant visitor pressures on the Breckland SPA & SAC; Great Yarmouth North Denes SPA; Winterton – Horesey Dunes SAC; and North Norfolk Coast SAC, SPA & Ramsar.			

6. Mitigations and Recommendations

6.1 Revision of JCS Policies

As part of the Appropriate Assessment process the policies of the JCS have been continuously reviewed and refined to ensure compliance with the Habitats Regulation and national guidance on biodiversity and planning. This has included specific policies on addressing climate change, protecting environmental assets, promoting good design, and maximising the low-carbon, local renewable technologies (notably the area-wide Policies 1, 2 and 3). The Policies as presented in the JCS provide a robust and sustainable way forward in delivering future growth within the Greater Norwich area.

6.2 Mitigations

In addition to the changes in the JCS policies, a series of mitigations are recommended to minimise any potential significant effects, alone or in-combination, on the European and Ramsar designated sites.

6.2.1 Green Infrastructure and Greenspace Allocation

Key to the JCS policies and ensuring no significant impacts on European and Ramsar designated sites is the full implementation of the Green Infrastructure Strategy. In particular, the development of Green Infrastructure priority areas supporting key growth locations and the delivery of Green infrastructure projects which manage access and transportation issues across the GNDP area is significant to minimize negative effects.

The provision of 'multi-functional green infrastructure' has the potential to meet a wide range of social, economic and environmental needs. For example, a greenspace can function as a public open space, water retention/storage facility, wildlife corridors and also non-motorised transport corridors.

Green infrastructure is defined as the multi-functional network of greenspaces and inter-connecting green corridors in urban areas, the countryside in and around towns and rural settlements, and in the wider countryside. Green infrastructure is a natural life support system providing benefits for people and wildlife. It encompasses 'natural' greenspaces (colonised by plants and animals and dominated by natural processes) and 'man-made' greenspaces (urban parks and designed historic landscapes), as well as their many connections (footpaths, cycleways, green corridors and waterways). The provision of publicly accessible natural greenspace is a vital component in securing benefits for communities where this can be balanced with the needs of private landowners and biodiversity conservation objectives.

Specific mitigations and greenspace allocation relate to the NDR and planned developments around Rackheath, which have the potential to infringe into land areas within identified buffer zones around European and Ramsar designated sites. Therefore to reduce any potential direct effects on specific designated sites the following mitigations should be considered:

- Land parcels between the NDR and the River Wensum could be marked as restricted development areas. This would assist in minimising any potential in-combination and cumulative effects on the River Wensum SAC, and;
- Land parcels north of the planned Rackheath development could be marked for greenspace development only. This would assist in minimising any potential direct and indirect effects on the Broads SAC and Broadland SPA & Ramsar site.

6.2.2 Water Infrastructure Improvements

A key potential impact on designated sites is associated with water abstraction and water discharges. Therefore to reduce any potential direct, indirect and in-combination effects on various designated sites, it will be essential that any future abstraction and discharges fully complies with the Habitats Regulation, national guidance and requirements.

The Water Framework Directive (WFD) sets a target of aiming to achieve at least 'good' status in all waters by 2015. The recently published Draft River Basin Management Plan (Draft RBMP) for the Anglian River Basin District presents an assessment of the current status of the Anglian water bodies and in most cases postpones the achievement of this target to the subsequent cycles (2021 or 2027). In the specific case of the Natura 2000 sites the achievement of good status is a priority within the WFD. The WFD relies on the Natural England assessment of the designated sites conservation status to achieve favourable status. By doing this the designated sites conservation objectives are included in the WFD and as set out in the Draft RBMP:

'Achieving the protected areas objective is also a key part of the WFD and one of the priorities for the first cycle of the river basin management'.

Therefore, investment and use of best available technology is required to ensure that all water abstractions and all water discharges from WTWs are in full compliance with the WFD requirements.

The WCS concluded that for some WwTW it will not be possible to achieve WFD under best available technology. This because water sources just downstream the WwTw will breach nutrients thresholds and will not achieve GES. However results from mass balance model suggested that for the European designated sites phosphorus standards are achievable. This will only be possible through technical improvements at Acle, Reepham and Whitlingham WwTWs. However, the Position Statements from Natural England (letter dated 26th January 2010) and the Environment Agency (letter dated 27th January 2010) state:

'In relation to 'Planned Deterioration', there are significant uncertainties as to the acceptability of this approach, and the development of an Environment Agency national policy will dictate whether the relaxations in targets might be regarded as legitimate'

In the context of this Task 2 AA, the uncertainties in relation to significant effects on designated sites in relation to water abstraction and discharges is dependent on policy review and the implementation of appropriate mitigations as specified in the WCS. Regarding water resources and increase in water demand several mitigation measures were suggested, such as:

- Increased Groundwater abstractions through existing abstraction licences (Thorpe St. Andrew Borehole);
- New Groundwater Resource Development (probably within Norwich), and;
- Whitlingham Effluent Flow Compensation scheme.

However investigations need to be carried out to ensure that:

- New groundwater sources - the aquifers are not hydrologically connected to the River Wensum SAC, and;
- The AWS Effluent Flow Compensation scheme is proved to be feasible and able to provide for the reduction scheme as required by the Environment Agency and to satisfy estimated increase in water

demand. However, greater water efficiency use has the capability to defer the need for the effluent flow compensation scheme.

Importantly, these consideration will be reviewed, addressed and implemented under the AWS Water Resource Management Plan (WRMP), which does not challenge the conclusions of the WRMP in ensuring that sufficient water supplies can be made available to meet planned growth (as stated in the AWS Position Statement letter dated 28th January 2010).

6.2.3 Water Efficiency

Inter-related to the water infrastructure improvements is the need for water efficiency, the use of water efficiency measures will have the potential to reduce increase in demand. The Position Statement by Natural England clearly states that significant levels of reduction will be required to satisfy the conclusion of the Review of Consents on the River Wensum SAC, and subsequently opportunities to implement mechanisms to achieve water efficiency and water neutrality, as discussed in the WCS. Water efficiency targets should then be implemented through appropriate mechanisms, including the WRMP.

Policy 3 of the JCS clearly states that development will be dependent on there being sufficient water infrastructure and greater efficiency to protect and improve water quality and resources.

6.3 Delivery and Monitoring

It is important that the outcomes (the mitigations described above) are fed into the Development Plan Documents (DPDs), other local development documents and resource management plans (such as the WRMP), to ensure proper implementation and enforcement. Further review of the JCS policies is not deemed necessary, as the JCS policies alone would not have any significant impact on European and Ramsar designated sites.

It is also important to ensure that a sufficient level of monitoring to determine the effectiveness and impacts of the JCS policies is undertaken, as proposed in Policy 20 of the JCS. In particular, it is recommended that a long-term monitoring programme is undertaken to understand the way ecohydrological systems within the River Wensum respond to changes in water quality and flows and the relative importance of different sources of ecological impacts (notably water abstraction/discharge vs. diffuse pollution). This will be of particular importance determining effectiveness attributed to Policy 3.

7. Conclusions

As required under the Habitats Regulations, a detailed Task 1 Test of Likely Significance and Task 2 Appropriate Assessment for the GNDP Joint Core Strategy have been undertaken. As part of the process the policies of the JCS have been continuously reviewed and refined to ensure compliance with the Habitats Regulations and national guidance on biodiversity and planning. This has included the appraisal of specific policies on addressing climate change, protecting environmental assets, promoting good design, maximising the low-carbon, local renewable technologies and water efficiency (notably the area-wide Policies 1, 2 and 3).

With the revision of JCS policies and the inclusion of specific mitigation measures, it is deemed highly unlikely that the JCS polices alone would have a significant direct or indirect impact on European and Ramsar designated sites. As such, further review of the JCS policies is not deemed necessary.

There is uncertainty in relation to potential impacts associated with water resources, water efficiency, growth and tourism resulting from in-combination and cumulative impacts associated with policy 3 and 4 (and related policy 10 & 12) within the JCS area and growth in the neighbouring LDF areas (North Norfolk, Great Yarmouth, Breckland and the Broads). Those designated sites affected within the region are:

- The Broads SAC;
- Broadland Ramsar & SPA
- River Wensum SAC
- Great Yarmouth North Denes SPA;
- Winterton – Horsey Dunes SAC, and;
- North Norfolk Coast SAC, SPA & Ramsar.

Any uncertainty regarding any potential impacts on European and Ramsar designated sites resulting from the planned growth within the GNDP area can be avoided and mitigated against. But the effectiveness of these policies in ensuring no significant impacts on European and Ramsar designated sites is dependent upon implementation of the mitigations. Therefore, it is probable that a no likely significant effect (NLSE) on European and Ramsar designated sites should be achievable through the following measures (as described in section 6);

- The implementation of green infrastructure developments;
- The allocation of greenspace to protect specific natural assets and designated sites and implemented through Area Action Plans, and;
- The implementation of water infrastructure improvements and water efficient measures as recommended in the WCS, enforced through the AWS Water Resource Management Plan and as supported by the Position Statements issued by AWS, Natural England and the Environment Agency.

The JCS polices have evolved through the Appropriate Assessment process to ensure that future developments within the area are sustainable and take into consideration climate change and ensure the protection of environmental assets.

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