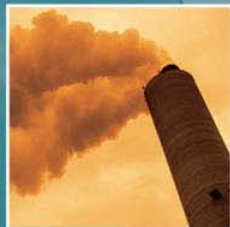


# King's Lynn and West Norfolk Borough Council

## Outline Water Cycle Study

Final Report

December 2009



# Entec

*Creating the environment for business*

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## Document Revisions

No.	Details	Date



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**Report for**

Peter Jermany  
Borough Council of King's Lynn & West Norfolk  
King's Court  
Chapel Street  
King's Lynn  
PE30 1EX

## King's Lynn and West Norfolk Borough Council

## Outline Water Cycle Study

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**Main Contributors**

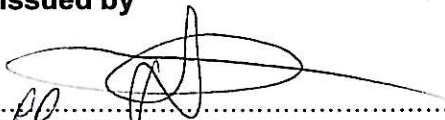
Peter Daldorph  
Peri Boitsidis  
Katie Hill  
Sandra Ryan  
Ella Thomason  
Simon Warner

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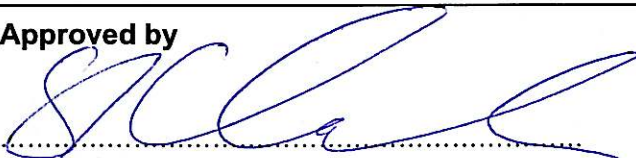
December 2009

Entec UK Limited

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**Issued by**  
.....  
Peter Daldorph

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**Approved by**  
.....  
Simon Clarke

---

**Entec UK Limited**

Trinity House  
Cambridge Business park  
Cowley Road  
Cambridge  
CB4 0WZ  
England  
Tel: +44 (0) 1223 393546  
Fax: +44 (0) 1223 393861

Doc Reg No. C24265/r

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## Executive Summary

### Purpose of this Report

Borough of King's Lynn and West Norfolk is preparing its Core Strategy Delivery Plan to plan for the local development to meet the objectives set by the Regional Spatial Strategy, RSS. The Core Strategy currently makes provision for a total 16,200 in the Borough between 2001 and 2025. The Borough requires investment in additional residential and commercial development to stimulate and accommodate economic growth and improve the quality of life in the area.

The purpose of this Water Cycle Study (WCS) is to identify if there are any water related issues that present significant obstacles to the success of development and where and when these issues may occur. The study has involved working with the key stakeholders; Anglian Water, the Environment Agency, Natural England, the Borough Council and County Council to identify the key constraints within the water cycle and identify integrated solutions in order to achieve sustainable development.

This Water Cycle Study report examines how much growth can be accommodated within the existing infrastructure and potential environmental constraints that may restrict growth and infrastructure solutions. It also explores opportunities to enhance green infrastructure through the development of water infrastructure.

### Study Area

The Borough of King's Lynn and West Norfolk covers an area of 1,471km<sup>2</sup> located in the west of Norfolk and borders the eastern shoreline of the Wash. The area is primarily rural in nature, dominated by arable farming. The largest town is King's Lynn which has an urban area of approximately 28km<sup>2</sup>, followed by Downham Market in the south and Hunstanton to the north on the coast, as well as a large number of smaller settlements. The Borough is largely low lying and includes a large area of fenland where the landscape is dominated by drainage channels managed by Internal Drainage Boards. The study area is at the downstream end of the Great Ouse catchment that drains a large area of Eastern England although there also are a number of smaller rivers in the area. The area also includes Greensand and Chalk aquifers.

### Water Resources and Demand Management

Although the Environment Agency's Catchment Abstraction Management Strategy (CAMS) documents indicate that there is no scope to increase abstraction from surface water and groundwater sources supplying the Borough, existing headroom within the water supply system is sufficient to meet additional demand associated with the planned housing growth. This assessment takes into account impacts on wetland sites which are considered acceptable under current levels of abstraction. However, the ecological footprint of the water supply system will be reduced if household water demand is controlled. Reduction in demand will also increase the security of supply



and increase the resilience of the system in relation to climate change. It is, therefore, recommended that a reduction in water demand is encouraged through the planning process and leadership by the Council. It is recommended that the Borough of King's Lynn and West Norfolk include planning policy recommendations, as soon as possible, for all new developments to meet the Code for Sustainable Homes (CSH) Level 3 / 4 with regard to water efficiency in order to reduce the pressure as far as possible on the region's water resources. By 2010 all new public sector developments and private homes must comply with Code level 3/4. This would equate to daily per capita consumption of 105 litres and would help the Local Authority establish a bar in terms of sustainability, as well as affordability. From 2016 the Government expects all new homes to be zero carbon (level 5/6), and water efficiency forms an important part of this. Development of policy and leadership on water demand issues should form part of the Phase 2 work. Further consideration should also be given in Phase 2 to the schedule of water supply infrastructure provision in relation to specific housing development options.

## Wastewater Treatment and Water Quality

The proposed housing development within the Borough is mainly in the catchment areas of King's Lynn, Downham Market and Hunstanton sewage works. These sewage works discharge into the tidal Great Ouse, the Flood Relief Channel and the Heacham River shortly before it reaches the Wash. Environmental capacity in these waters is sufficient to make impacts of housing growth and associated increases wastewater flow trivial with the possible exception of:

- Phosphorus and nitrogen concentrations in the rivers in the Borough are already high and likely to fail future Water Framework Directive targets. Consequently, improvements may be required to treatment processes at the wastewater treatment works to reduce nutrient emissions and achieve load standstill or 'no deterioration' in pollution loads. Impacts of housing growth on wastewater discharges and diffuse pollution in the upstream catchment also need to be considered in this context because this determines the environmental headroom to receive additional wastewater loads. Further investigation of impacts at Downham Market and the inland sewage works that are at or exceed the consented dry weather flow are recommended for the detailed phase.
- Impacts of the discharge from Heacham sewage works and the urban drainage system in Hunstanton and Heacham on the Bathing Water at Heacham are a potential issue in relation to housing growth although Anglian Water are addressing this issue through a series of investigations within their forthcoming Asset Management Planning programme (AMP5). If available, information from these investigations should be considered in more detail in Phase 2 to determine whether water infrastructure is required to mitigate the impacts which may place timing constraints on the housing developments.

Following planned investment the capacity of the sewerage network is believed to be sufficient to accommodate increases in wastewater flows although it will be necessary to ensure that the timing of this investment ties in with the phasing of housing development.



## Drainage and Flood Risk

Flood risk is considered in detail in the SFRA for the Borough of King's Lynn and West Norfolk and the reader should consult this document for further information. In summary, under current conditions flood risk is unlikely to constitute a significant constraint on future growth in the proposed development areas which are beyond the areas of higher flood risk. More detailed assessment of flooding issues related to specific development sites will be required through the planning process following the requirements of PPS25. The Gaywood River development area requires provision of additional flood storage capacity in the flood plain which has already been designed by the King's Lynn IDB. Tidal flood risk is substantially increased under simulated climate change conditions and provision of enhanced flood defence infrastructure is likely to be required.

SuDs will be an important element of future developments to avoid increases in downstream flood risk and water quality impacts of urban runoff on local water courses. SuDs also provide opportunities for the development of green infrastructure and a framework for future provision of SuDs management should be developed in Phase 2 of the WCS, taking into account the local hydrological constraints, landscape and the wider ecological network.

## Green Infrastructure

Development of water infrastructure provides opportunities for the creation of green infrastructure and habitats. Although ecological benefits and new green space may result from water infrastructure as a 'secondary' benefit of meeting engineering requirements, they are likely to be enhanced if they are promoted at the design stage and integrated into the King's Lynn and West Norfolk Borough Council Green Infrastructure Strategy. Developing water infrastructure within the context of a Green Infrastructure Strategy would also allow it to be consistent with the natural features of the local environment and co-ordinate the approaches of different infrastructure providers (e.g. housing developers, water companies, internal drainage boards). The primary opportunity for green infrastructure and ecological development is in relation to surface drainage and, in particular, sustainable urban drainage. Although SuDs have intrinsic green infrastructure and ecological benefit these can be enhanced by careful design which should take into account the wider network of connected habitats and the nature of the landscape. The Green Infrastructure Strategy and WCS provides an opportunity to develop a framework for this design philosophy.

## Implementation

Implementation of the recommendations of the WCS is dependent on local authority policy and leadership. This may take the form of:

- Promotion of aims of the WCS through the Core Strategy;
- Guidance on planning through development of Supplementary Planning Documents;
- Development of provisions in Area Action Plans;



- Council advice and guidance notes for developers. This may take the form of a developer's checklist that will aim to ensure that developers follow all the necessary steps to minimise the impact of developments on the water environment. Adoption of this approach will help ensure that the Environment Agency does not object to development in relation to water issues. Guidance might also be provided by a local framework for the design of sustainable urban drainage; and
- Continued stakeholder engagement and partnership working.



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