# Executive Summary

## Outline

Existing government development targets for Greater Norwich to 2021 and possible future targets to 2031 could mean that up to 51,000 new dwellings will be built. In view of the long lead in times and extensive costs associated with water infrastructure, it is appropriate for this study has to take such a long term view.

Stage 2a of the Greater Norwich Water Cycle Study (GNWCS) builds on the findings of Stage 1 completed in November 2007 and intends to provide the following:

- Identify and address the data gaps from Stage 1;
- Develop a cost schedule for comparing the Potential Growth Areas (PGAs) in 12 Norwich Policy Areas (NPAs) and 8 Rural Policy Areas (RPAs) to enable the GNDP to make an informed decision of their preferred options;
- Provide approximate costs for providing water infrastructure in terms of wastewater, water supply and water resources for each of the PGAs whilst being mindful of the flood risk to and from the PGA and the potential impacts on the environment for each of the options;
- Rank the PGAs in terms of their suitability for progression for 10,000 possible dwelling scenarios (PDSs) for the NPAs and 1,000 PDS for the RPAs;
- Provide a scope of works for Stage 2b to be undertaken on receipt of the preferred options from the GNDP.

## Data Gaps

Many of the data gaps which were identified in Stage 1 could not be completed because of a lack of detail. These include:

- The Environment Agency's Review of Consent (RoC) process has not been completed, hence acceptable quality and quantity of discharge from existing wastewater treatment works (WWTWs) cannot be confirmed;
- Anglian Water Services (AWS) have confirmed that they do not have an existing model network of the water infrastructure within the study area, hence modelling could not be undertaken;

However, a number of data gaps were investigated further. These included:

- An assessment of the capacity of the receiving watercourse was undertaken. By reviewing the location of the existing WWTWs the flood risk from additional discharge was qualitatively assessed by comparing the proximity to existing development and environmental designations to the WWTWs. Red, amber or green traffic lights for each of the WWTWs were assigned.
- An assessment of the capacity of the existing sewer network was undertaken to verify an AWS statement that there is no spare capacity for future development as an allowance needs to be made for climate change and for infill and development. This assessment was carried out for each of the PGAs and the results broadly agreed with the statement.

## Develop Cost Schedule

In order to rank the PGAs to inform the preferred options selection, they were compared with each other in terms of:

- Cost of provision of wastewater to Whitlingham WWTW, costs of utilising an existing WWTW where applicable and the costs of a new WWTW;
- Cost of the provision of water supply infrastructure to Heigham water treatment works (WTW);
- Cost of various water resources options including upgrading the existing borehole licences, provision of water through the Greater Ouse Groundwater Development Scheme (GOGDS), reuse of the treated effluent from Whitlingham into the River Wensum and off line storage on the River Wensum.

Furthermore, the impact of flood risk to and from the site, suitability of Sustainable Drainage Systems (SUDS) as well as the potential impacts on existing conservation designations, impact on the groundwater vulnerability and impacts on Groundwater Source Protection Zones was assessed, and traffic lights for each of these assigned accordingly.

The costs of the infrastructure were based on unit costs per metre for the pipeline (water resources and water supply) and costs per population equivalent (PE) for the WWTW.

## Ranking

A ranking system was devised so that the PGA could be compared with each other under various options. These options included:

- NPA Option 1 - All wastewater to Whitlingham WWTW;
- NPA Option 2 – All wastewater to an existing WWTW;
- NPA Option 3 – Construction of a new WWTW;
- RPA Option 1 – All wastewater to an existing WWTW.

The cost of the providing the infrastructure was compared for each of the 11 PGAs (NPA 11 City was not included) and ranked accordingly with "maximum" score of 220 and minimum score of 20. For each of the traffic lights a score of 20 was provided fir a green traffic light, 10 for an amber traffic light and 0 for a red traffic light. *Red traffic lights do not necessarily mean that development cannot be progressed.* The total score for each of these constraints was ranked, with favourable PGAs identified. Generically, the ranking of the PGAs was often influenced by the distance of pipeline to Heigham WTW and the available headroom within the existing WWTW.

## Stage 2b

It is expected that the GNDP will consider the outcomes of the WCS and in conjunction with other strategic studies for the area will a short list of preferred options. Stage 2b of the GNWCS is intended to provide a more detailed analysis of these preferred options, and will build on the cost exercise undertaken in Stage 2a, as well as consider more detailed site specific assessment of environmental constraints. Furthermore, the development management will be assessed identifying where possible developer contributions, development phasing and the compilation of a developer checklist.