

The Abberton Scheme

Environmental Statement

Non-technical Summary

December 2007



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1 What is proposed and what is the purpose of the Environmental Statement?

Following extensive environmental and engineering work, Northumbrian Water Limited (NWL) is making a series of planning applications for the Abberton Scheme (see Box NTS.1, overleaf). These applications are accompanied by an Environmental Statement, as required under the *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* (the 'EIA Regulations'), the preparation of which forms part of the environmental impact assessment (EIA) of the Abberton Scheme. This is a Non-technical Summary of the Environmental Statement.

NWL is the statutory water undertaker for a large part of south Essex, including the towns of Chelmsford, Brentwood, Witham and Southend-on-Sea, and the London Boroughs of Redbridge, Barking and Dagenham, and Havering ('the Essex Supply Area'), where NWL trades as Essex & Suffolk Water¹.

Under the *Water Industry Act 1991*, NWL has a statutory duty to provide all of its customers with a sufficient supply of wholesome drinking water and to do this in such a way as to conserve and enhance the environment. Further duties, relating to biodiversity, are imposed under the *Wildlife and Countryside Act 1981*

and the *Natural Environment and Rural Communities Act 2006*.

Drinking water is supplied from NWL's water treatment works, which, in turn, are supplied with water from rivers, reservoirs, boreholes and other sources.

In order to minimise wastage of water, NWL has invested extensively in the control of leakage from pipes and the management of consumer demand. However, despite these measures, successive water resource plans (prepared by NWL) have shown that the amount of water available in the Essex Supply Area is currently below what is required for NWL to meet its statutory duty. This situation is predicted to worsen as the population grows.

¹ – In this summary, no further reference is made to Essex & Suffolk Water (all references are to NWL).

To meet the shortfall, NWL is proposing to implement the 'Abberton Scheme' (also referred to hereafter as 'the Scheme'), which includes the following elements:

1

Abberton Reservoir Enhancement

Provision of increased storage capacity for untreated water at the existing Abberton Reservoir (located to the south of Colchester in Essex) by enlarging the reservoir, which will secure additional water resources and improve the reservoir's value for biodiversity.



2

Denver Licence Variation

Powers for increased abstraction (by the variation of abstraction licences held by the Environment Agency) from the River Ely Ouse near Denver (located near to Downham Market in Norfolk), via the associated Cut-off Channel and Blackdyke intake (the latter located between Denver and Thetford).



3

Transfer Enhancement

Provision for increased conveyance of water from Denver to Abberton Reservoir through enhancement of the capacity of an existing water transfer system comprising the Environment Agency's 'Ely-Ouse to Essex Transfer Scheme' (EOETS) and NWL's 'Essex System'. This will require the construction of two new pipelines.



The elements of the Scheme are illustrated on Figure NTS.1 (overleaf) and described in section 4 of this non-technical summary.

As well as providing the environmental information required to accompany the planning applications, the Environmental Statement includes environmental information in relation to applications for other consents that are needed to deliver the Scheme (see Box NTS.1).

This document summarises the content and conclusions of the remainder (Parts A – H) of the Environmental Statement, to which readers should refer for further information.



Box NTS.1 – Principal authorisations required for the Abberton Scheme

Planning permission

Construction of the Abberton Scheme will require planning permission under the *Town and Country Planning Act 1990* for the construction of two pipelines and associated structures, and the enhancement of Abberton Reservoir (see section 4). Due to the geographical spread of the Scheme, planning permission will be sought from four planning authorities:

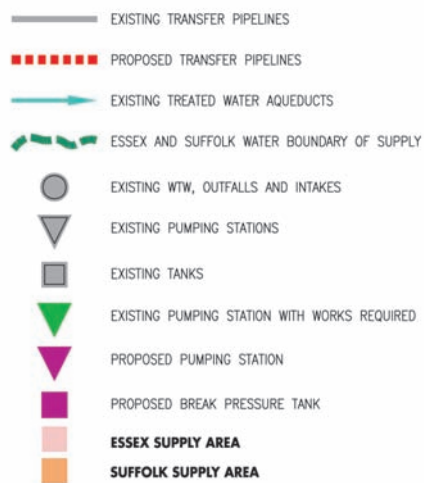
- East Cambridgeshire District Council - Kirtling Green to Wixoe Pipeline (part);
- St Edmundsbury Borough Council - Kirtling Green to Wixoe Pipeline (part);
- Braintree District Council - Kirtling Green to Wixoe Pipeline (part); and
- Colchester Borough Council - Wormingford to Abberton Pipeline (plus associated infrastructure) and Abberton Reservoir Enhancement.

Other authorisations

To supply water to the enhanced Abberton Reservoir will require a variation to the Environment Agency's existing licences for abstracting water from the River Ely Ouse at Denver and the Cut-off Channel at Blackdyke (see section 4). Changes will also be required to NWL's licence to abstract water from the River Stour, for onward transfer to Abberton Reservoir. A new impounding licence will be required for the reservoir. Other permissions/authorisations that will be required are described in chapter 8, in Part B of the Environmental Statement.

Figure NTS.1 – Abberton Scheme overview





The following sections of the non-technical summary describe:

- the reasons why the Abberton Scheme is required;
- the main alternatives that were considered for the provision of additional water resources and the reasons for selecting the preferred alternative;
- the proposed Scheme;
- the EIA process; and
- the likely significant environmental effects of the Scheme.

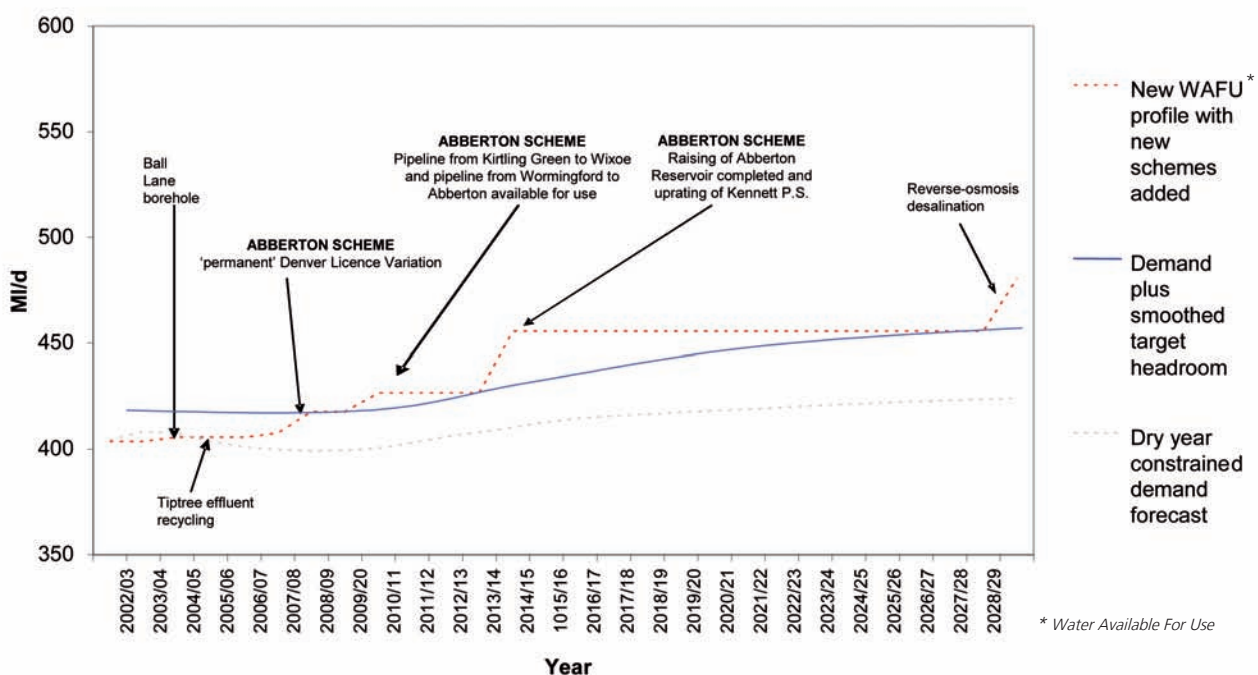
2 Why is the Abberton Scheme required?

Water companies are required to prepare a water resource plan every five years, in accordance with guidance laid down by the Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency. The plan must demonstrate that the water companies have sufficient water supplies to meet the demands from current and future customers over the next 25 years, which is the recognised timeframe for water resource planning, or that they need to constrain demand and/or develop new supplies over this period. NWL's first plan was produced in 1999 and the second, and current, plan for NWL's Essex and Suffolk Supply Areas was produced in 2004.

The Essex & Suffolk *Water Resource Plan 2004* (WRP04) sets out in detail the justification of need for the Abberton Scheme (see Appendix B-1 of the Environmental Statement).

All components of supply and demand are determined and forecast by following regulatory guidance or best practice methodologies and all are subject to external audit by NWL's regulators. The WRP04 has been accepted by the Environment Agency and Ofwat. Significant expenditure between 2005 and 2010 has been allowed by Ofwat to advance the promotion and early construction of part of the Abberton Scheme. The supply/demand balance graph in Figure NTS 2 (below) shows the deficit in NWL's current and future water resource availability.

Figure NTS 2 – WRP04 – Essex supply demand balance (with planned schemes)



Since the 1970s, NWL has made use of water derived from the River Ely Ouse (a 'donor river') at Denver in Norfolk to help to fill its reservoirs at Abberton and Hanningfield. This involves water being transferred to the River Stour and the River Pant (the 'receiving rivers') via the EOETS. The EOETS, which is owned and operated by the Environment Agency, comprises a network of watercourses, pipes and tunnels that are used to transfer water that would otherwise flow into the Wash at King's Lynn.

The extra flow in the receiving rivers is used to support NWL's water abstractions from these rivers, both for direct supply to water treatment works at Langham and Langford, and for transfer via pipelines for storage in Abberton and Hanningfield Reservoirs, and subsequent treatment at Layer-de-la-Haye and Hanningfield water treatment works respectively.

In dry years, up to 35% of the demand for water in the Essex Supply Area is met from the transfers, although in a year of average rainfall, only about 7% of the demand is met in this way. In wet years, NWL may have no requirement for water from transfers, as there is enough natural water in the Stour and other rivers to fill Abberton and Hanningfield Reservoirs.

The most recent periods of severe drought in Essex were from 1988 to 1992 and from 1995 to 1997; 1997 is when restrictions on water use were last imposed by NWL. Despite the introduction, since 1997, of further leakage and demand management measures, and the addition of new sources of supply (e.g. the Langford Recycling Scheme), there are still insufficient water resources available to



NWL to meet the existing demand for water in the event of another prolonged dry period. This shortfall is set to increase as the demand for water in the Essex Supply Area is predicted to rise by around 6% over the next 25 years, almost entirely due to an increase in population.

There is a therefore a requirement to make available a long term and sustainable increase in water resources for use in the Essex Supply Area. Without this increase, NWL would be forced, in prolonged dry periods, to reduce the supply of water to its customers.

This would involve the extended use of measures such as appeals for reduced water use, hosepipe bans, restrictions of non-essential use of water and, ultimately, cuts in supply at unacceptable frequencies. The Abberton Scheme will significantly reduce the need for, and frequency of, such restrictions.

Alongside the Abberton Scheme, NWL is accelerating its leakage and metering actions and increasing its promotion of water efficiency. However, none of these measures alone or in combination negate the need for the Scheme.

3 What are the main alternatives?

Alternative schemes that were considered

A range of alternative means to meet the need for water have been considered. These include:

- demand management options – such as further leakage control, increased provision and promotion of metering and water efficiency;
- new reservoir storage – as an alternative to enlarging Abberton Reservoir, over 250 potential sites were considered for creating new reservoirs or increasing the capacity of existing reservoirs; and
- a wide range of other new water resource options – such as canal transfers (using the British Waterways' network), transfer of water from the River Trent, and desalination.

Desalination was ruled out because of the high economic and environmental costs resulting from its predicted energy consumption. Most of the other options available to NWL would either require elements of the Abberton Scheme to be provided anyway, or would be limited in the volume of additional water that they could provide and would not delay the need to take forward the Abberton Scheme. The option of 'do-nothing' would fail to meet future demand for water and, far from safeguarding the existing high nature conservation value of the reservoir (for which it is classified/ listed as an internationally important Special Protection Area [SPA] and Ramsar site, and notified as a nationally important Site of Special Scientific Interest [SSSI])², could lead to its decline towards an unfavourable state, as increased drawdown became necessary to try to meet demand.

The Abberton Scheme was therefore selected as the most appropriate means of providing sufficient water to meet the predicted demand over the current water resources planning horizon.



² – The reservoir is a SPA classified under the *Council Directive of 2 April 1979 on the conservation of wild birds (79/409/EEC)* (the EC Wild Birds Directive); it is also a Ramsar site, listed under the *Convention on wetlands of international importance especially as waterfowl habitat (Ramsar, Iran, 1971)* and a SSSI, notified under the *Wildlife and Countryside Act 1981*.

Options considered to deliver the Abberton Scheme

Various options were identified which would allow the Scheme to be delivered. These included options for:

- the quantity of water to be abstracted from the River Ely Ouse at Denver (i.e. the Denver Licence Variation);
- the combination of pipelines and rivers to be used for transferring the additional water from Denver to Abberton;
- the parts of Abberton Reservoir to be raised; and
- the top water level of the raised Abberton Reservoir.

The choice of the preferred option for abstraction at Denver was largely based on consideration of potential effects on sites of high nature conservation value. Six options for the Denver Licence Variation were subject to a high level assessment, in consultation with the Environment Agency and Natural England, focusing on the potential effects on four European Sites³ (the Ouse Washes, Wash, Stour Estuary, and Abberton Reservoir) and the River Stour. For each of the European Sites, and for the River Stour, a series of assessment parameters was identified. The chosen option, which aims to balance the needs of the donor and receiving rivers, was considered most likely to deliver benefits for these sites and least likely to cause adverse effects.

A large number of different options was considered to transfer the additional water that would be abstracted at Denver, such as:

- specific engineering works in the upper River Stour to allow it to convey more water;
- construction of new pipelines;
- maximising the use of existing infrastructure;
- use of other river systems (e.g. the River Glem, River Colne and the Roman River); and
- different combinations of these options.

On environmental grounds the combination of a pipeline parallel to the upper Stour and a pipeline from Wormingford to Abberton was chosen as the preferred option combination. Detailed environmental considerations were then applied in order to select the precise routing of the pipelines and the sites for associated infrastructure (e.g. a pumping station at Wormingford).

The decision about how to provide the required additional storage at Abberton Reservoir was influenced by the desire to minimise the increase in the footprint of the reservoir and the loss of surrounding farmland, whilst also conserving important habitats in the Western and Central Sections of the reservoir⁴. Taking into account engineering, environmental and financial implications of raising by 3, 4 or 5 metres, the preferred option was a raising of the top water level of only the Main Reservoir by 3.2 metres, which would provide an additional 58% water storage capacity.

³ – European sites are SPAs and Special Areas of Conservation.

⁴ – Abberton Reservoir consists of three parts defined as the Western Section, Central Section and Main Reservoir.

4 What does the Abberton Scheme comprise?

The Abberton Scheme involves the Abberton Reservoir Enhancement, a variation to the abstraction licence at Denver (the 'Denver Licence Variation') and enhancing the system for transferring water between Denver and Abberton Reservoir (the 'Transfer Enhancement'). These are summarised in this section.

Abberton Reservoir Enhancement

Abberton Reservoir was constructed between 1936 and 1939. It is a pumped storage reservoir, owned and operated by NWL. The reservoir is fed by minor natural inflow from the Layer Brook and larger quantities of pumped flows from the River Stour, which in turn can be supported by the EOETS and, occasionally (under drought conditions), from other groundwater sources. There is also some pumped input of water from the Roman River and from a borehole at Ball Lane, near Abberton village.

Abberton Reservoir is of international importance for waterfowl, particularly over winter and during the late summer moulting period; this is reflected in it being an SPA, Ramsar site and SSSI. The reservoir's importance for waterfowl is related to its location and physical characteristics, and its plant and animal populations, which provide important sources of food for the birds.

The Abberton Scheme involves increasing by 58% the capacity for storing untreated water in Abberton Reservoir. This will be achieved by raising the top water level in the main, eastern part of the reservoir by 3.2 metres.

This raising together with various habitat creation and management measures that form part of the Scheme have been designed to increase the value of the reservoir for birds and other wildlife. For example, most of the existing concrete edge to the reservoir will be removed and replaced with gently shelving edges, which are attractive to many species of waterfowl. Improved habitats will also be created around the margins of the reservoir. These works have also been designed to enhance the landscape. The new and enhanced habitats will be managed over the long-term to benefit wildlife and the landscape.

As well as habitat creation work, the Scheme includes a number of other aspects that will deliver environmental benefits, or avoid or reduce adverse effects, either during construction or once the enhanced reservoir is in use. These aspects are detailed in the Environmental Statement and include:



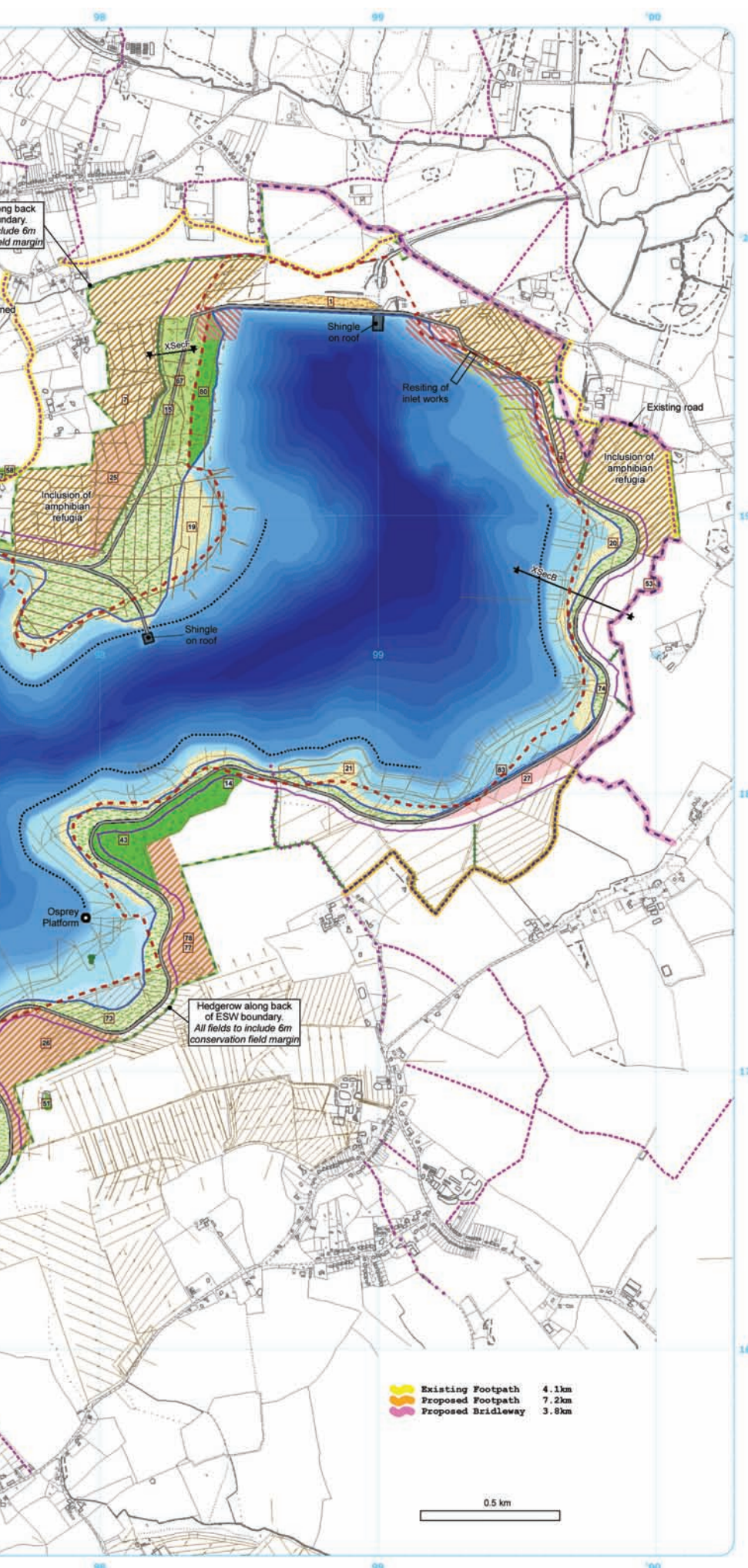
Artist's impression of the proposed Visitor Centre.

- implementation of an extensive range of measures relating to legally protected animal species and other fauna as well as flora;
- adoption of a traffic management plan to minimise effects of construction traffic on road users and others;
- adoption of pollution prevention measures during construction, in accordance with the Environment Agency's guidance;
- adoption of noise and air quality control measures;
- careful storage and handling of soils during construction;
- measures to minimise adverse effects on cultural heritage features;
- provision of a new and improved Essex Wildlife Trust Nature Reserve and Visitor Centre; and
- enhancement of public access routes around the reservoir and improved parking provision along the B1026.



Grey heron. The reservoir's concrete edges will be replaced by more natural features.





Abberton Reservoir proposed indicative habitat layout

Key

- Proposed Water Level
- SSSI/SPA boundary
- Acid grassland
- Building
- Farmland bird habitat
- Lagoon
- Borrow Pit
- Pond
- Reedbed
- Marginal and emergent vegetation
- Reptile habitat
- Rough grassland
- Woods (T1)
- Woods (T2)
- Existing woodland
- Waterfowl habitat
- Wet grassland
- Geo mat
- OSA
- Trees retained for Osprey nesting (Indicative positions only)
- Water control gate
- ESW boundary hedge (22.5km)
- Tall screening hedge (5.9km)
- Forestry scheme hedge (12.2km)
- Lagoon ditches
- Reefs
- Proposed roads
- Cross Section Lines
- Construction Zone
- Drainage scheme
- Public Rights of Way
- Footpath
- Bridleway
- Other Public Access
- Other route with public access
- Proposed permissive access
- Permissive footpath
- Permissive bridleway

Denver Licence Variation

As part of the Abberton Scheme, it is proposed that the Environment Agency's licence for the abstraction of surface water from the River Ely Ouse at the Denver Complex will be varied. The variation, which will not require any construction work, will make available additional water for transfer through the EOETS, thus securing the potential for a long-term, additional supply of water to a raised Abberton Reservoir. The increase in the total amount of water that can be abstracted over an 18-month period (starting in April) will be from 79,555 Megalitres (Ml) to 100,000Ml. This is required to accommodate the abstraction volume needed to meet the maximum predicted demand that is able to be met by the Essex System. A corresponding increase will also be required in the Agency's Blackdyke licence.

The water abstracted at the Denver Complex would otherwise flow either directly into the tidal River Great Ouse at Denver Sluice or via the Flood Relief Channel (a freshwater drainage channel, the flow and level within which are



Denver Sluice

controlled by sluices at either end) to the tidal River Great Ouse just south of King's Lynn. The tidal River Great Ouse flows into the Wash, which is an SPA, because it supports internationally important migratory bird populations. The Wash also lies within the Wash and North Norfolk Coast Special Area of Conservation (SAC), is listed as a Ramsar site for its importance as an international wetland, and is notified as an SSSI. Part of the south-east Wash is also designated as a National Nature Reserve.

The quantity of water that flows from the River Ely Ouse to the tidal River Great Ouse is subject to a 'Hands-Off' Flow (HOF), which is the minimum flow that must be released to tide whenever abstraction takes place. This was designed originally to maintain adequate water quality in the tidal River Great Ouse but also has the effect of maintaining suitable conditions for irrigation, navigation and amenity purposes. There are set values for the HOF for each month and it is proposed to amend the monthly HOFs to be the same as those that applied during a temporary variation to the Denver Licence from 1997 to 2002, which was introduced to address drought



The Denver Complex

problems in Essex. This will mean a reduction in HOF in October, November and December, and an increase in HOF in March and April, resulting in less water being available for transfer in spring but allowing the transfer of more water in late autumn and early winter for storage in Abberton Reservoir.

There will be no change in the maximum licensed daily abstraction for transfer via the EOETS, which will remain at 455ML.

Transfer Enhancement

The Transfer Enhancement will provide the means of transferring additional water, abstracted at the Denver Complex, to Abberton Reservoir. It will involve a system of pipeline and river transfers.

The existing EOETS does not have the pumping capacity to transfer the current maximum licensed daily quantity of 455ML per day (ML/d). Therefore additional pumping capacity will be provided at Kennett Pumping Station to allow more water to be transferred.

Also as part of the Scheme, a new pipeline will run from the existing transfer route at Kirtling Green in Suffolk to Wixoe on the Essex/Suffolk border, where the additional water will be put into the River Stour. This pipeline, which will have a capacity of 145ML/d, is needed as there is insufficient capacity in the upper River Stour to accommodate the proposed higher maximum rates of transfer. An additional pumping station will be provided near Wormingford, Essex, where water will be abstracted from the River Stour and transferred via a second new pipeline to Abberton Reservoir.

When the transfer of water from Denver is not operating, the Wormingford Pumping Station and the pipeline to Abberton will enable NWL to overcome the pumping and storage constraints that currently prevent it from fully utilising water available in the River Stour during naturally high flow conditions, usually during the winter. The combination of abstracting these higher natural flows from the River Stour and the potential for increased transfers from Denver will be used to fill the enlarged Abberton Reservoir.

The design for the construction and operation of the new pipelines includes the following measures:

- adoption of a traffic management plan to minimise the effects of construction traffic on road users and others;
- use of various tunnelling techniques to route the pipeline under the River Stour and River Colne, as well as the A12 road, the adjacent railway and London Road, Stanway;



Example of the pipe laying process

- implementation of an extensive range of measures relating to legally protected animal species and other fauna as well as flora;
- avoidance of additional flood risk;
- adoption of pollution prevention measures in accordance with the Environment Agency's guidance;
- tree planting and other landscape works around structures associated with the pipelines;
- adoption of noise and air quality control measures;
- careful storage and handling of soils during construction;
- minimisation of adverse archaeological effects; and
- in the case of the Kirtling Green to Wixoe Pipeline, full flexibility to control the division of flows between the pipeline and River Stour to allow more flexibility in management of the flow regime in the upper River Stour, thus reducing some of the existing adverse effects associated with high rate transfers.

Currently, water is only transferred from Denver to Essex via the EOETS for water supply purposes when all of the following conditions are met:

- the level of Abberton and/or Hanningfield Reservoirs fall below a control level, which is separately defined for each month of the year by a control curve⁵;
- there is insufficient natural flow in the River Stour or the River Pant/Blackwater to enable abstraction to take place in order to supply the reservoirs; and
- the full HOF is being released from the River Ely Ouse to the tidal River Great Ouse.

The same conditions will also apply in future under the Abberton Scheme.

Therefore, the EOETS is not in constant use and nor will it be in constant use under the Abberton Scheme. The amount that it is used varies year on year depending on rainfall and demand for water. Based on modelling, using current demand for water applied to climatic conditions (and natural river flows) that occurred over a 25 year time period (1972-96), the average quantity of water transferred in each 18 month period is about 18,000MI. Without the Scheme, this is predicted to rise to about 22,000MI by 2027 (and even this would not provide satisfactory security of supply). With the Scheme in place, the need for transfers would be about 19,000MI on average in an 18 month period. The Abberton Scheme will provide water for transfer to ensure security of supply during periods of prolonged dry weather and drought in Essex, when supplies available in the Rivers Stour and Pant/Blackwater would otherwise not be able to meet the demand for water in the Essex Supply Area.

5 – A curve showing the amount of water that needs to be held in a reservoir at any particular time during a typical dry year to give an agreed likelihood of refill by April for a given demand for water. If the reservoir level falls below the control curve, this provides a trigger for turning on the EOETS, subject to there being sufficient water at Denver to allow transfers to take place within the abstraction licence conditions.

5 The EIA process

Defining the scope of the assessment

Due to the nature of the Abberton Scheme, it was determined that the planning applications should be accompanied by an Environmental Statement under the EIA Regulations.

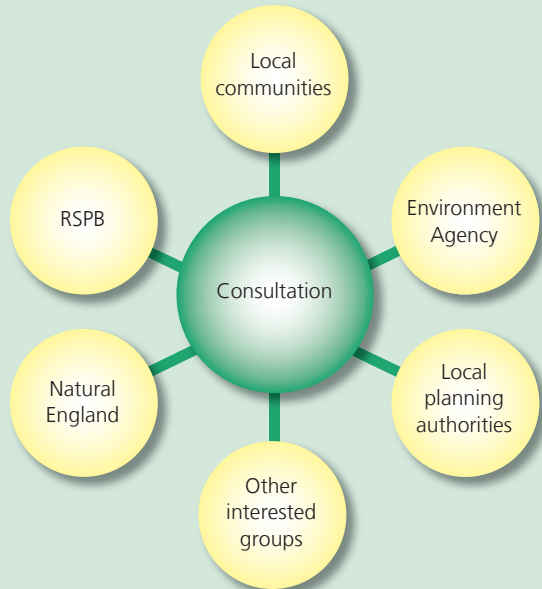
A scoping report was prepared in April 2005 to define the work that it was considered at that time was needed to assess the potentially significant environmental effects of the proposed Scheme. Comments received from consultees were reviewed by the consultant team and NWL.

The scope of the assessment has been progressively refined since April 2005, in response not only to consultees' comments on the scoping report but also comments from subsequent consultation, environmental information obtained from survey and assessment work, and the design process. This design process involved the consultant team working together to consider how the proposals could be refined, with a view, where possible, to avoiding or reducing adverse effects and delivering environmental enhancements by incorporating appropriate environmental measures into the Scheme.



Public consultation events helped define the scope of the assessment (Sudbury, April 2006)

Many stakeholders have contributed to and informed the development of the Scheme – a full list of consultees is provided in Appendices C-2 and C-3 of the Environmental Statement



The assessment approach

The Environmental Statement includes an assessment of the predicted environmental effects of the proposed Scheme. As required by the EIA Regulations, the assessment focuses on effects that are potentially significant. This requires a comparison to be made between the likely environmental conditions in the presence of the Scheme and in its absence (i.e. the 'baseline').

As the various elements of the Scheme will be built over a period of six years and then operated indefinitely, it cannot be assumed that the baseline conditions in the absence of the Scheme would be the same as at present. This reflects changes resulting from human influences, such as new development or increased water demand, and processes, such as siltation within rivers, all of which have the potential to modify the current environmental conditions.

Where it is concluded in the Environmental Statement that aspects of the current conditions are likely to represent the future baseline, the assessment is based on current conditions. Where this is not the case, the likely baseline for a particular element of the Scheme is extrapolated or otherwise predicted and the assessment is undertaken against these predicted future baseline conditions.

Reaching a conclusion about which effects, if any, are significant is the culmination of an iterative process that involves the following stages:

1. identifying those effects that may be significant;
2. assessing environmental changes and any consequent effects on people, animal / plant species or other 'receptors'; and
3. determining whether or not these effects are likely to be significant.



Consultation event held in Abberton, October 2006

6 What are the likely predicted significant effects of the Scheme?

Overview

The assessment has considered the likely significant effects, whether positive or negative, on population (including visual effects, and recreation and socio-economics), flora and fauna (i.e. biodiversity), soil, water, air, climatic factors, material assets (including cultural heritage), landscape and the inter-relationship between all of these factors. Of the large number of potential effects that have been considered, the only significant effects of the Scheme relate to biodiversity, landscape and visual, noise, and recreation and socio-economics, as described below.



Part of the upper reach of the River Stour.



Part of the middle reach of the River Stour.

Biodiversity

The effects of the Transfer Enhancement on the River Stour have been assessed in consultation with the Environment Agency. In the upper Stour, water transfer affects habitat suitability for different groups of fish in different ways, with higher flows tending to benefit trout and lower flows benefiting coarse fish. Without measures such as careful management of the operation of the EOETS, the proposals might have significant adverse effects on brown trout in the upper Stour and upper Pant due to the changed requirements for transfers in the spawning season.

The provision of a pipeline parallel to and alongside the upper Stour means there is an opportunity for benefits in this stretch of the river during operation of the Scheme by reducing existing adverse effects of high rate transfers.



Waterfowl such as Gadwall will benefit from an enhanced environment at Abberton Reservoir.

The enhancement of Abberton Reservoir will result in significant positive effects for biodiversity, due to the:

- creation of additional lagoons around the western end of the reservoir prior to the construction works, which will then provide habitat for waterfowl that could be displaced as a result of construction activity – the lagoons will be a permanent feature and will therefore also deliver benefits once the construction works are complete;
- design of the raised Main Reservoir, which will provide enhancement of the habitat available for the waterfowl for which the reservoir is designated as a nationally and internationally important site;
- creation of shallow lagoon habitat, which will benefit uncommon plants such as the short-leaved water starwort and provide important feeding habitat for wildfowl;
- removal of most of the existing concrete edge and its replacement by improved 'natural' shoreline/marginal habitat, which will be part of the habitat enhancement works that will benefit the nationally and internationally important bird populations and will also benefit aquatic plants such as the great yellow cress;
- enhancement of terrestrial habitat around the reservoir including hedgerows, grassland and ponds, which will benefit many species such as great crested newt, and species of reptile and terrestrial invertebrate;

- increase in the amount and quality of new and existing habitat at the western end of the reservoir for water vole; and
- the creation of new foraging habitat for breeding birds and bats.

Landscape and visual

During the pipeline construction works, significant adverse visual effects are likely for users of public rights of way (including the Stour Valley long distance footpath near Great Bradley, Great Wrating and near Wormingford, and the Essex Way near Fordham) and for the occupants of Moat Farm (north of Stanway) due to the proximity of the site compound for the tunnel under the railway and the A12. Although significant, these effects are all associated with construction activities and as such they are all temporary.

Construction activities at Abberton Reservoir have been assessed as having significant negative visual effects; there will also be negative effects on the landscape. However, these effects will

be temporary and, following completion of the Scheme, there will be significant long term benefits on the landscape and on people's views as a result of the creation of a more natural shoreline to the reservoir together with other habitat enhancements that form part of the Scheme.

Recreation and socio-economics

The Abberton Scheme will enable NWL to meet both the existing and predicted future shortfall in water supply (up to 2027) to its customers in the Essex Supply Area. This is a significant positive effect.

If the Scheme were not to proceed, not only would this shortfall remain and indeed worsen but, in addition, there would be adverse environmental effects, particularly at Abberton Reservoir, where greater and more frequent drawdown of water levels would be needed. This would adversely affect biodiversity and the landscape.

Photomontage illustration of a view, during construction (2010), from a public right of way near Layer Hall.



Noise

The construction works at Abberton Reservoir have been designed to minimise the effects of noise on nearby residents. However, due to the need to excavate a local source of sand and gravel from Rye Borrow Pit for use in the Scheme, activity will be taking place in close proximity to a small number of residents at Rye Farm and Rye Cottages. Although working in this area will be carefully controlled and will operate to reduced working hours compared to the rest of the construction works, significant noise effects are likely.

Energy use

Energy use is an important factor in considering the wider environmental effects and sustainability of most water resource schemes, as water pumping has a high energy demand. Implementation of the Abberton Scheme will change the energy demands of the EOETS and Essex System.

An approximate estimate of electrical energy use per unit of water transferred has been calculated in the Environmental

Statement, based on quoted pump electrical ratings and pumping capacities or, where available, on manufacturers' pump test results.

Table NTS 6.1 gives a comparison of modelled energy use for the completed Scheme supplying the predicted 2027 water demand, with energy use for the predicted future (2027) baseline and the existing situation, based on a 25-year time-series from 1972-96.

To deliver the predicted 2027 water supply-demand, the proposed Scheme will use less energy over the long-term than would be the case without the Scheme (the 2027 baseline), both in terms of total energy use and in terms of energy used per unit of water supplied. For this energy budget, the Scheme will ensure an improved security of supply in drought periods, which would not be the case under the 2027 baseline scenario.

The 2027 Scheme scenario shows a 5% increase in water supplied over the current situation for a similar energy use per unit of water supplied. Therefore effects on the climate will be minimised.

Table NTS 6.1

Modelled energy use for the completed Scheme compared with baseline

Energy use for 25 years from 1972-96	Current demand baseline	2027 demand baseline	2027 demand with completed Scheme
Total energy use (GWh)	652	726	692
Energy use per megalitre put into supply (kWh)	230	240	230

7 Where can more information be found?

The full Environmental Statement (15 volumes) is available for public inspection at the Essex Wildlife Trust Visitor Centre at Abberton Reservoir and by appointment at Essex & Suffolk Water's Hall Street office in Chelmsford. Contact Sarah Pinkerton on 01245 212 862 or by e-mail – Sarah.Pinkerton@nwl.co.uk

For alternative inspection locations, please contact the appropriate local authority as listed in Box NTS.1.

Printed copies may be purchased from Northumbrian Water at a cost of £400+p&p. Electronic copies are available free of charge from NWL. Contact Sarah Pinkerton (details above).

Alternatively, the Environmental Statement (excluding Appendices) can be viewed online at www.eswater.co.uk



**NORTHUMBRIAN
WATER**

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